STANDARD KEMAHIRAN PEKERJAAN KEBANGSAAN
(NATIONAL OCCUPATIONAL SKILLS STANDARD)

F433-004-2:2018

BLASTING AND PAINTING OPERATION

OPERASI PEMBAGASAN DAN PENGECATAN

LEVEL 2

JPK

Jabatan Pembangunan Kemahiran
Kementerian Sumber Manusia, Malaysia

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NATIONAL OCCUPATIONAL SKILLS STANDARD

BLASTING AND PAINTING OPERATION

OPERASI PEMBAGASAN DAN PENGECATAN

LEVEL 2

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Abbreviation

1.	CIDB	Construction Industry Development Board
2.	CP	Competency Profile
3.	CPC	Competency Profile Chart
4.	CoCU	Curriculum of Competency Unit
5.	EPU	Economic Planning Unit
6.	HSE	Health, Safety and Environment
7.	ISO	International Organization for Standardization
8.	ITP	Inspection & Test Plan
9.	JHA	Job Hazard Analysis
10.	JPK	Jabatan Pembangunan Kemahiran (Department of Skills Development)
11.	JSA	Job Safety Analysis
12.	MSIC	Malaysian Standard Industrial Classification
13.	MSDS	Material Safety Data Sheet
14.	MOGSC	Malaysian Oil & Gas Service Council
15.	NACE	The North American Association of Corrosion Engineers
16.	NKEA	National Key Economy Area
17.	NOSS	National Occupational Skills Standard
18.	OAS	Occupational Area Structure
19.	OA	Occupational Structure
20.	PETRONAS	Petroliam Nasional Berhad
21.	PPE	Personal Protective Equipment
22.	PTW	Permit to Work
23.	QA/QC	Quality Assurance / Quality Control
24.	SKM	Sijil Kemahiran Malaysia
25.	SOP	Standard Operating Procedures
26.	SSPC	Society for Protective Coatings
27.	WFT/DFT	Wet Film Thickness / Dry Film Thickness

Glossary

1.	Abrasive Blasting	A surface preparation method by cleaning surfaces under high pressure streams to remove contaminants or paint before applying a protective coating on the surface.
2.	Fusion Bonded Epoxy Coating	A method to coat the surface using epoxy-based powder which are set thermally and sprayed onto surfaces to form a coating. It is an environmentally-safe thermosetting coating method since it forms a hard barrier right after it melts and fuses on metal surface.
3.	High Pressure Water Jet Blasting	A surface preparation method by cleaning surfaces using high pressure water jet to remove contaminants or paint before applying a protective coating on the surface
4.	Passive Fire Protection Coating	A method to coat the surface using fire protection and fire resistance properties.
5.	Protective Coating And Painting	A method to paint and coat the surface to give a fine appearance for longer protection against corrosion.
6.	Stripe Coat	Additional coats of paint that are applied locally to welds, fasteners and external corners. Their function is to build a satisfactory coating thickness at edges and corners where paint has a tendency to contract and thin upon drying.
7.	Thermal Metal Spray Coating	A method to coat the surface using metallic materials being deposited in molten condition onto surfaces by heat application to form a coating. This is to enhance the corrosion resistance of a surface, thus giving protection of structures in the most hostile environment such as sea water.
8.	Wet Film Thickness / Dry Film Thickness	A method to measure coating thickness after coating is applied to steel surfaces, which have been previously cleaned with abrasive blasting.

Acknowledgement

The Director General of Department of Skills Development (DSD) would like to extend his gratitude to the organisations and individuals who have been involved in developing this Standard including:

i. National Skills Development Council (NSDC)
ii. Standard Technical Committee (STC)
iii. Standard Technical Evaluation Committee (STEC)
iv. Standard Development Committee (SDC)
v. Facilitator
vi. Secretariat
vii. Related Organisations

STANDARD PRACTICE

NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR:

BLASTING AND PAINTING OPERATION

LEVEL 2

1. Introduction

The enactment of Petroleum Development (PDA) Act 1975, formed the Petroliam Nasional Berhad (PETRONAS) which today has made the oil and gas industry to become one of the most important economic sector in Malaysia. According to Economic Planning Unit (EPU) report, currently the industry contributes between 20% to 30% to the Malaysia's Gross Domestic Product (GDP).[1]

The Oil, Gas and Petrochemical industry has been identified as one of the twelve National Economic Areas (NKEA) in Malaysia. Some of the approaches are to sustain the production of oil and gas by spurring deep-water exploration and Enhanced Oil Recovery (EOR) techniques as well as the development of marginal fields; to encourage continued downstream activities by making Malaysia a regional storage and trading hub and unlocking premium gas demand; and to grow oil and gas industry supporting services for both upstream and downstream industries. Together with baseline sector growth, this sector will provide a Gross National Income contribution of RM61.2 billion by 2020.2

PETRONAS has identified 10 potential Enhanced Oil Recovery (EOR) projects in offshore Malaysia. The implementation of EOR technology at Tapis field offshore since 2014 is expected to boost the production by up to 35,000 barrels oil per day and secures continuous income from oil and gas for another 30 years.[3] This implies that there are more opportunities for Oil, Gas and Petrochemical industry related service providers such as construction, operation and maintenance in this area shall continue its growth.

1.1. Occupational Overview

Abrasive blasting and painting is part of the corrosion prevention and protection work for pipelines and structures. The surface preparation and coating systems can be implemented in various industrial sectors such as offshore oil and gas platforms, onshore refinery plants, gas transmission stations, shipyards, steel fabrication facilities and many others. In the oil and gas industry, blasting and painting work range from painting pipes and structures to specialised corrosion prevention and fireproofing services to help maintain facilities at optimal efficiency.

Abrasive Blasting is a surface preparation method by cleaning surfaces under high pressure streams to remove contaminants or paint before applying a protective coating on the surface. The procedure method for applying abrasive blasting can be either dry or wet. The blasting method can be manual blasting and auto blasting. There is another method of blasting that is not using abrasive media, which is using high pressure water jet for surface blasting. An industrial blaster will be required to prepare surfaces to standards developed and published by international organisations such as North American Association of Corrosion Engineers (NACE), Society for Protective Coatings (SSPC) and International Organization for Standardization (ISO) 8501.

[1] Malaysia – Oil and Gas from website https://www.export.gov/article?id=Malaysia-Oil-and-Gas-Equipment
[2]The Malaysian Oil & Gas Industry: Challenging times but fundamentals intact. May 2016. www.pwc.com.my
[3]About TAPIS Enhanced Oil Recovery (EOR). from website /www.petronas.com.my

Painting is the most commonly applied method to protect surfaces using different materials of different properties. Painting technology is advancing rapidly and specialised equipment and materials are being introduced into the industry. The three main basic methods are brush, roller and spray. Paint spray can be divided into conventional spray, airless spray and High Volume Low Pressure (HVLP) spray. In practice the term, 'paint' covers a wide range of materials with different properties. Moreover, there are also specialised coating technology include passive fire protection coating, thermal metal spray and fusion bonded epoxy coating.

This occupation involves high potential safety and health hazards, therefore the personnel who work in the blasting and painting operation in the Oil, Gas and Petrochemical industry must have undergo specialised training. Due to the nature of the occupation, industrial blasters and painters must adhere to all workplace health, safety, environmental and securities requirements and policies.

1.2. Rationale of NOSS Development

The oil discovery in Malaysia has created numerous employment opportunities in the oil and gas industry. In the Oil, Gas and Petrochemical industry, blasting and painting crews are part of the services to be provided for corrosion prevention to help maintain facilities at optimal efficiency. The demand for sufficient skilled personnel in blasting and painting operation is increasing.

This NOSS document gives the requirements for the blasting and painting operation in terms of job competencies that is required to carry out the job. The NOSS can be used as an instructional manual guide by training institute for a structured training in blasting and painting operation, hence producing competent personnel in this area.

This NOSS is a reviewed document, which was first developed in 2012. This NOSS document is being revised in order to be used for developing industrial blasters and painters specially to meet the changes in technology and skill requirements especially in the Oil, Gas and Petrochemical industry. At present, there are various types of equipment, abrasive materials, coating materials, application techniques and other advanced technology in the market. Therefore, revision of the existing NOSS document is to provide a better understanding of the industry in order to enhance the skill sets that a blasting and painting operators should have to suit with the Oil, Gas and Petrochemical Industry.

1.3. Rationale of Occupational Structure and Occupational Area Structure

Occupational Structure shows career pathway for particular occupation derived from Occupational Analysis (OA) process. This table describes the Industry Sector, Sub-sector, Job Area, Job Title and Level of an occupation based on information gathered from needs analysis or industries input.

Based on Malaysian Standard Industrial Classification (MSIC) 2008, Blasting and Painting Operation is under Section F – Construction and Group 43 – Specialised Construction Activities. The Occupational Structure (OS) and Occupational Area Structure (OAS) are shown in Figure 1 and Figure 2 respectively, showing the job titles for blasting and painting operation.

The discussion from panel experts decided that this job area starts at Level 2, in which the personnel should be competent in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non-routine and required individual responsibility and autonomy.

1.4. Regulatory / Statutory Body Requirements Related to Occupation

Regulatory and statutory bodies in Malaysia are as the following:

- Construction Industry Development Board (CIDB)–authority and the regulator which is responsible in the construction industry.
- Department of Occupational Safety and Health (DOSH) - authority and the regulator which is responsible into ensure compliance of safety and health requirements at workplace.

Under the Blasting and Painting Operation, there are few Acts and Regulations to be followed, such as:

- Act 144 of Petroleum Development Act 1974
- Act A1407 of Malaysia Construction Industry Development Board of Act 520 (Amendment) 2011
- Act 514 of Occupational Safety and Health Act 1994 (Amendment) 2006.
- Act A1268 of Factories and Machinery Act 139 (Amendment) 2006
- Act 672 of The Solid Waste Management and Public Cleansing Act 2007

1.5. Occupational Pre-Requisite

The minimum requirements for those interested to work in blasting and painting operation is physically and medically fit.

2. Occupational Structure (OS)

Section	(F) Construction				
Group	(43) Specialised Construction Activities				
Area	Blasting And Painting Operation	Blasting And Painting Quality Assurance and Quality Control	Blasting And Painting Material Control	Piping	Structure
Level 5	Operation Manager	QA/ QC Manager	Project Manager	Piping Fabrication Superintendent	Structure Fabrication Superintendent
Level 4	Engineer	QA/ QC Engineer	Material Coordinator	Piping Fabrication Supervisor	Structure Fabrication Supervisor
Level 3	Supervisor	QA/ QC Supervisor	Warehouse Storekeeper	Piping Fabricator	Structure Fabricator
Level 2	Blaster / Painter / Foreman	QA/ QC Inspector	Storekeeper/ Material Controller	Piping Senior Fitter	Structure Senior Fitter
Level 1	Helper	-	-	Piping Fitter	Structure Fitter

Figure 1: Occupational Structure (OS)

3. Occupational Area Structure (OAS)

Section	(F) Construction
Group	(43) Specialised Construction Activities
Area	Blasting and Painting Operation
Level 5	Blasting and Painting Project Management
Level 4	Blasting and Painting Operation Management
Level 3	Blasting and Painting Supervision
Level 2	Blasting and Painting Operation
Level 1	No Level

Figure 2: Occupational Area Structure (OAS)

4. Definition of Competency Levels

The NOSS is developed for various occupational areas. Below is a guideline of each NOSS Level as defined by the Department of Skills Development, Ministry of Human Resources, Malaysia.

Level 1: Competent in performing a range of varied work activities, most of which are routine and predictable.

Level 2: Competent in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non-routine and required individual responsibility and autonomy.

Level 3: Competent in performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non-routine. There is considerable responsibility and autonomy and control or guidance of others is often required.

Level 4: Competent in performing a broad range of complex technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present.

Level 5: Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources features strongly, as do personal accountabilities for analysis, diagnosis, planning, execution and evaluation.

5. Award of Certificate

The Director General may award, to any person upon conforming to the Standards the following skills qualifications as stipulated under the National Skills Development Act 2006(Act 652):

- Malaysian Skills Certificate
- Statements of Achievement

6. Occupational Competencies

The Blasting and Painting Operation Level 2 personnel are competent in performing the following core competencies:

a. Blasting Equipment Preparation
b. Painting Equipment Preparation
c. Abrasive Blasting Operation
d. Protective Coating and Painting Operation
e. Blasting Material and Equipment Storage Handling
f. Painting Material and Equipment Storage Handling

For added value, the Blasting and Painting Operation Level 2 personnel is competent in performing the following elective competencies:-

a. Specialised Surface Cleaning Application
b. Specialised Protective Coating Application

7. Work Conditions

Generally, the blasting and painting personnel is expected to carry out their duties in offshore, onshore, marine, factories, blasting and painting yards as well as construction sites. Blasting and painting work is usually performed as finishing touches of protective coating after welding, concreting, steel work and other engineering work.

In the oil, gas and petrochemical industries, blasters and painters may expect to work in environments under extreme pressures and confined spaces. Blasting and painting working procedures involve many hazardous operations. Hence, the blasters and painters are required to adhere strictly to legislative requirements particularly the use of Personal Protective Equipment (PPE) as per Health, Safety and Environment (HSE) requirements.

8. Employment Prospects

The Oil, Gas and Petrochemical industry in Malaysia is continue to expanding with major projects requiring an equally great demand of skilled and specialist workers. This includes activities such as exploration, research and development (R&D), extraction and operation. Despite the current fluctuations in crude oil prices globally, Malaysia is still going to continue expanding their projects within the sector and thus still opens up opportunities for blasting and painting operation skilled personnel.

Other than in Oil, Gas and Petrochemical industry, the basic principles for blasting, painting and coating operation are applicable to various industries such as in in the construction, power plant, marine, automotive, aviation, rail, shipbuilding and many more. Therefore, this will increase the chance of employment prospects of competent blasters and painters to explore their career pathways in other industries using the similar knowledge and competencies.

The Malaysian paint and coatings industry also recorded a 15% increase on total sales of RM3.64 billion at 257,047 metric tonnes in year 2016.[4]There are currently 26 SIRIM approved paints & coatings brands in Malaysia, and the industry currently employs 5,330 employees. 37% of paints & coatings manufactured in Malaysia are exported while 63% are sold locally for domestic use. Therefore, there is an encouraging demand for workforce for blasters and painters.

9. Up Skilling Opportunities

Blasters and painters acquire their competencies through on the job learning. Further certification may increase their chances of career advancement and with formal certification training; the experienced blasters and painters may advance to become certified inspectors or specialists as following area:

- Blasting and painting quality control
- Blasting and painting quality assurance
- Blasting and painting inspection
- Industrial corrosion and protection

[4]Malaysian Paint & Coating Industry : An Overview 2017http://www.crcg.com.my/malaysian-paint-coating-industry-overview-2017/

10. Organisation Reference for Sources of Additional Information

The following organisations can be referred as sources of additional information which can assist in defining the document's contents.

a. Petroliam Nasional Berhad (PETRONAS)
Tower 1, PETRONAS Twin Towers,
Kuala Lumpur City Centre,
50088 Wilayah Persekutuan Kuala Lumpur
Tel : 03-20515000
Fax : 03-20265050
Website: www.petronas.com

b. Institute of Materials Malaysia
No. 10-1, Jalan Bandar 3
Pusat Bandar Puchong
47100 Puchong
Selangor Darul Ehsan
Tel: 03-58823574
Fax: 03-58823524
Website: www.imm.org.my

c. Department of Occupational Safety and Health
Ministry of Human Resources
Level 2, 3 & 4, Block D3, Kompleks D,
Federal Government Administrative Centre
62530 Wilayah Persekutuan Putrajaya
Tel: 03-8865000
Fax: 03-88892443
Website : www.dosh.gov.my

d. Construction Industry Development Board (CIDB)
Level 7, Grand Seasons Avenue
72 Jalan Pahang
53000 Kuala Lumpur
Tel: 03-26170200
Fax: 03-26170220
Website: www.cidb.gov.my

e. SIRIM Berhad
No.1, Persiaran Dato' Menteri,
Section 2,P.O.Box 7035,
40700 Shah Alam,
Tel : 03-5544 6400
Fax : 03-55446694
Website : www.sirim.my

f. The North American Association of Corrosion Engineers(NACE)
1440 South Creek Drive
Houston, TX USA 77084-4906
Tel : +1 281-228-6223
Fax : +1 281-228-6300
Website : www.nace.org

g. Society for Protective Coatings (SSPC)
40 24th St 6th Fl
Pittsburgh, PA 15222
Tel: 1.412.281.2331
Fax : 412.281.9992
Website : www.sspc.org

h. International Organization for Standardization (ISO)
ISO Central Secretariat
1, ch. de la Voie-Creuse
CP 56
CH-1211 Geneva 20
Switzerland
Tel: +41 22 749 01 11
Fax : +41 22 733 34 30
Website : www.iso.org

11. Standard Technical Evaluation Committee

NO	NAME	POSITION & ORGANISATION
1.	Jefri bin Jamil	Painting Insulation Inspector M.J. Inspection
2.	Mohd Suhairi bin Mat Amin	Painting Inspector Ria Solution Sdn Bhd
3.	Aminuddin bin Ibrahim	Paint Inspector HHA Associates Sdn Bhd
4.	Aaron James Williams	Director Schmidt Abrasive Blasting Sdn Bhd

12. Standard Development Committee

BLASTING AND PAINTING OPERATION

LEVEL 2

NO	NAME	POSITION & ORGANISATION
1.	Mohd Zaidi Zainal bin Abidin	Blaster Painter / Senior Trainer ANTAP Semenanjung Sdn Bhd
2.	Mohamad Faisal bin Mohamad	Trainer INSTEP
3.	Muhammad Azizi bin Aziz	Painting Supervisor Hyundai Heavy Industries Co. Limited.
4.	Faidi bin Mohamad bin Lazim	Coating Technician TKSS Corrosion Technology Sdn Bhd
5.	Mohd Hadi bin Ismail	Painting Supervisor Rope Tech Sdn Bhd
6.	Wan Zuhaili Azri bin Wan Idris	Painting Supervisor Rope Tech Sdn Bhd
7.	Mohd Saiful bin Abdullah	Painting Supervisor Coral Alliance Sdn Bhd
8.	Mark Hew Yoon Onn	Executive Director Universal Corrosion Engineering (M) Sdn Bhd
9.	Mustapha Kamal Awang	Paint Inspector Ria Solutions Sdn Bhd
10.	Wan Zulkhairi Adli Wan Idris	Blasting Painting Foreman Dayang Sdn Bhd
11.	Adli Abu Bakar	Blasting Painting Trainer Akademi Binaan Malaysia Wilayah Timur
FACILITATOR		
11.	Zaira Hidayah binti Mohd Arshad	Facilitator Think Plus Consultation Sdn Bhd

STANDARD CONTENT

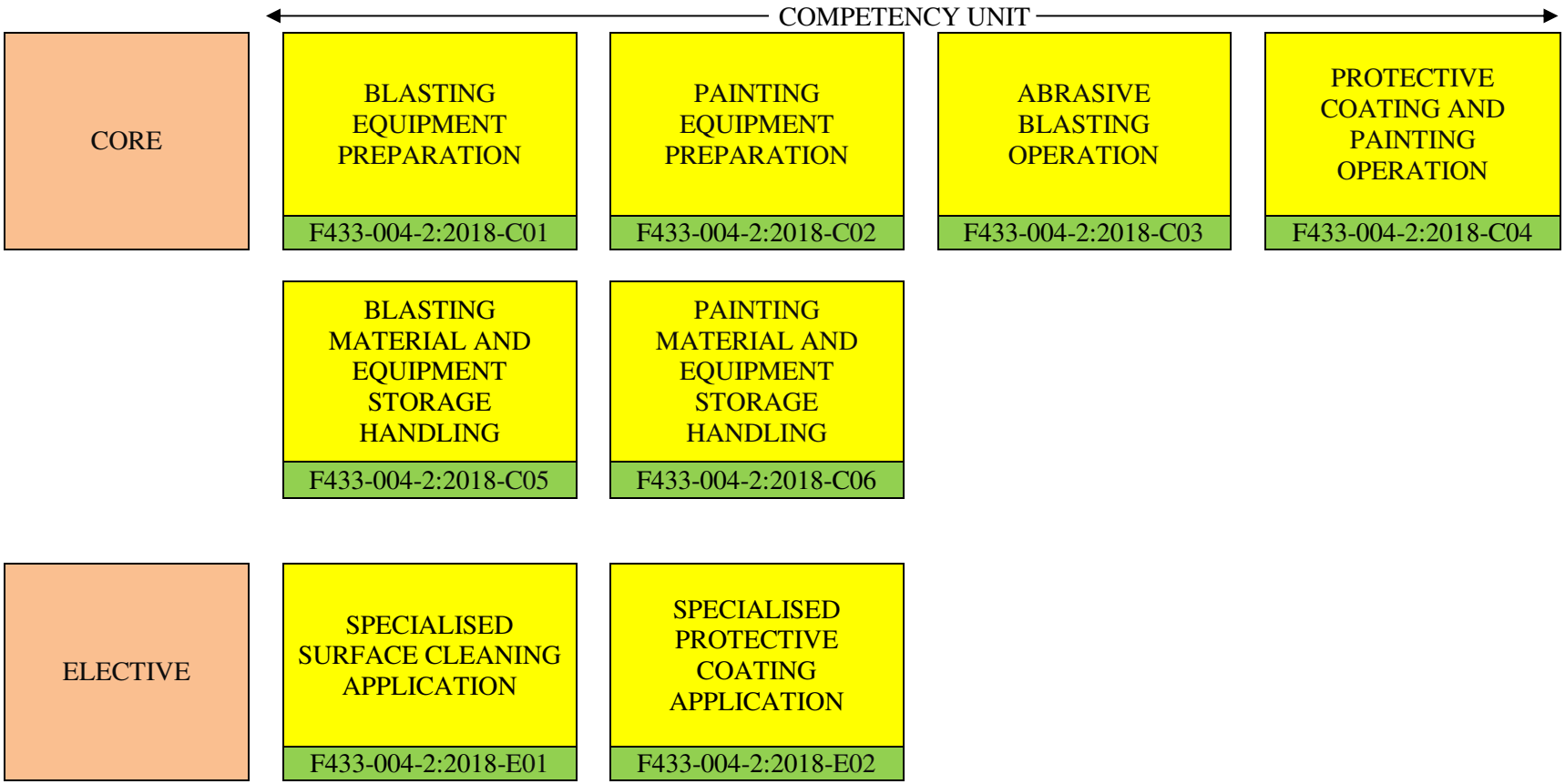
NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR:

BLASTING AND PAINTING OPERATION

LEVEL 2

13. Competency Profile Chart (CPC)

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
NOSS LEVEL	TWO (2)	NOSS CODE	F433-004-2:2018



14. Competency Profile (CP)

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
NOSS LEVEL	TWO (2)	NOSS CODE	F433-004-2:2018

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
1. Blasting Equipment Preparation F433-004-2:2018-C01	Blasting Equipment Preparation describes the groundwork requirements that needed to be done prior the start of blasting operation. The personnel who is competent in this CU shall be able to prepare blasting work area, set up blasting equipment and perform blasting work area housekeeping. The outcome from this CU is the requirements for blasting operation are prepared respectively in terms of area, equipment and housekeeping.	1. Prepare blasting work area	1.1 Blasting work site checked for safety and environment requirements 1.2 Personal Protective Equipment (PPE) identified according to working safety procedure requirements 1.3 Signage and barricade displayed at designated work area according to working safety procedure requirements 1.4 Protection on equipment, devices, piping and gauges applied according to work area preparation requirements 1.5 Blasting containment installed at job site according to workplace health and safety requirements 1.6 Safety requirements for working at height applied according to workplace safety requirements 1.7 Work area washing down procedure carried out according to work area preparation requirements
		2. Set up blasting equipment	2.1 Personal Protective Equipment (PPE) applied according to working safety procedure requirements 2.2 Blasting equipment, tools and connections

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			inspected for functionality and safe operation 2.3 Breathing air system filter condition checked and replaced in accordance with safety requirement 2.4 Materials transfer carried out to the work area before blasting operation according to working safety procedure requirements 2.5 Abrasive media checked and filled up to required level according to working safety procedure requirements
		3. Perform blasting work area housekeeping	3.1 Blasting equipment parts cleaning conducted according to manufacturer's specifications and cleaning requirements 3.2 Blasting materials, tools and equipment arranged at respective storage location according to housekeeping work procedure 3.3 Blasting work area housekeeping carried out in accordance with housekeeping work procedure 3.4 Wastes and scheduled wastes segregated in accordance with waste type and disposal requirements 3.5 Blasting work area reinstated to approved condition in accordance with standard housekeeping requirements

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
2. Painting Equipment Preparation F433-004-2:2018-C02	Painting Equipment Preparation describes the groundwork requirements that needed to be done prior the start of painting operation. The personnel who is competent in this CU shall be able to prepare painting work area, set up painting equipment and perform painting work area housekeeping. The outcome from this CU is the requirements for painting operation are prepared respectively in terms of area, equipment and housekeeping.	1. Prepare painting work area	1.1 Blasting work site checked for safety and environment requirements 1.2 Personal Protective Equipment (PPE) identified according to working safety procedure requirements 1.3 Signage and barricade displayed at designated work area according to working safety procedure requirements 1.4 Protection on equipment, devices, piping and gauges applied according to work area preparation requirements 1.5 Painting containment installed at job site according to workplace health and safety requirements 1.6 Safety requirements for working at height applied according to workplace safety requirements 1.7 Work area washing down procedure carried out according to work area preparation requirements
		2. Set up painting equipment	2.1 Personal Protective Equipment (PPE) applied according to working safety procedure requirements 2.2 Painting equipment, tools and connections inspected for cleanliness, functionality, and safe operation 2.3 Painting area masked up according to painting work procedure requirements 2.4 Materials transfer carried out to the paint storage and mixing area before painting operation according to working safety procedure requirements 2.5 Coating technical data sheet checked for

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			painting material specifications 2.6 Compressor filled up with diesel to required level according to working safety procedure requirements
		3. Perform painting work area housekeeping	3.1 Painting equipment parts cleaning conducted according to manufacturer's specifications and cleaning requirements 3.2 Painting materials, tools and equipment arranged at respective storage location according to housekeeping work procedure 3.3 Painting work area housekeeping carried out in accordance with housekeeping work procedure 3.4 Wastes and scheduled wastes segregated in accordance with waste type and disposal requirements 3.5 Painting work area reinstated to approved condition in accordance with standard housekeeping requirements

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
3. Abrasive Blasting Operation F433-004-2:2018-C03	Abrasive Blasting Operation describes the surface preparation method by cleaning surfaces under high pressure streams to remove contaminants or paint before applying a protective coating on the surface. The procedure method for applying abrasive blasting can be either dry or wet. The choice of abrasive media type and the required equipment depends essentially on the nature of surface to be cleaned. The personnel who is competent in this CU shall be able to interpret blasting Job Safety Analysis or Permit To Work, inspect blasting media, set up blasting equipment, carry out blasting equipment servicing, perform blasting activity and perform blasting finishing and small repairs. As the abrasive blasting operation involves handling of high pressurised equipment, the job safety procedures always are being highlighted to minimise potential safety and health hazards at work. The outcome of this CU is the abrasive blasting operation are completed and meet the standard	1. Interpret Blasting Job Safety Analysis or Permit To Work	1.1 Personal Protective Equipment (PPE) applied according to working safety procedure requirements 1.2 Scope of work identified according to blasting operation work requirements 1.3 Hazards identified according to blasting operation prior commencement of work 1.4 Equipment and tools operation checked for functionality and condition in compliance with job safety requirements 1.5 Safety equipment at work area checked for safety in compliance with job safety requirement 1.6 Blasting work area checked according to work layout diagram
		2. Inspect blasting media	2.1 Abrasive media type identified according to standard blasting job requirements 2.2 Abrasive Material Safety Data Sheet (MSDS) and Technical Data Sheet (TDS) identified according to standard blasting job safety requirement 2.3 Abrasive media physical condition checked according to blasting job requirement 2.4 Abrasive media quantity level checked according to blasting job requirement
		3. Set up blasting equipment	3.1 Compression condition, parameters and fittings checked according to blasting job requirements 3.2 Air pressure at nozzle checked for specification requirement

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	blasting specifications according to job requirements with awareness on health, safety and environmental requirements.		3.3 Blasting pot condition, parameters and fittings checked according to blasting job requirements 3.4 Blasting pot remote control system inspected and tested for safety 3.5 After cooler and air dryer system checked for parameters and fittings according to blasting job requirements 3.6 All connections and fittings secured to avoid leakage and equipment damage during blasting operation 3.7 Power tools equipment condition and settings checked according to blasting job requirements 3.8 Blasting breathing air system checked for health and safety requirements
		4. Carry out blasting equipment servicing	4.1 Type of blasting equipment identified for servicing 4.2 Blasting equipment servicing guidelines identified according to manufacturer's specifications 4.3 Blasting equipment checked for conditions, parameters and functionality according to manufacturer's specifications 4.4 Blasting equipment's fittings and connections secured to minimise possible damages during blasting operation 4.5 Worn out or defective parts replacement carried out or sent for repair according to manufacturer's specifications 4.6 Blasting equipment servicing recorded for reference according to company working procedures

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		5. Perform blasting activity	5.1 Climatic condition requirements for blasting operation identified and checked according to standard blasting specifications 5.2 Blasting materials prepared into blasting equipment in accordance with type of blasting 5.3 Non-required blasting surface protected before blasting operation start according to blasting work layout diagram 5.4 Blasting skills and technique applied as per blasting work instructions and safety requirements 5.5 Blasting equipment settings communicated to pot man using blasting communication signal method during blasting operation 5.6 Blasted surface profile and degree of cleanliness checked according to standard blasting specifications 5.7 Blasting work area housekeeping carried out in accordance with housekeeping work procedure
		6. Perform blasting finishing and small repairs	6.1 Incomplete blasted area identified for finishing requirements 6.2 Type of blasting defects identified for finishing and small repairs 6.3 Method of repair applied for defects to remove contaminants from surface using power tooling according to work requirements

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			6.4 Blasting conducted manually using power tooling or hand tools to inaccessible blasting area as per blasting work layout diagram 6.5 Standard power tooling type, specifications and condition checked according to blasting requirements 6.6 Blasting work area housekeeping carried out in accordance with housekeeping work procedure

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
4. Protective Coating and Painting Operation F433-004-2:2018-C04	Protective Coating And Painting Operation describes the activity to paint and coat the surface to give a fine appearance for longer protection against corrosion. This CU is based on the paint spray method and covers pre-painting, painting and post-painting activities. The personnel who is competent in this CU shall be able to interpret painting Job Safety Analysis or Permit To Work, inspect painting materials, set up painting equipment, carry out painting equipment servicing, perform painting activity and perform painting finishing and small repairs. As the protective coating and painting operation involves handling of high pressurised equipment, the job safety procedures always are being highlighted to minimise potential safety and health hazards at work. The outcome of this CU is the protective coating and painting operation are completed and meet the standard painting specifications	1. Interpret Painting Job Safety Analysis or Permit To Work	1.1 Personal Protective Equipment (PPE) applied according to working safety procedure requirements 1.2 Scope of work identified according to painting operation work requirements 1.3 Hazards identified according to painting operation prior commencement of work 1.4 Equipment and tools operation checked for functionality and condition in compliance with job safety requirements 1.5 Safety equipment and work area checked for safety in compliance with job safety requirement 1.6 Painting work area checked according to work layout diagram
		2. Inspect painting materials	2.1 Painting material type identified according to standard painting work requirements 2.2 Paint Material Safety Data Sheet (MSDS) and Technical Data Sheet (TDS)identified according to standard painting work safety requirements 2.3 Painting material specifications and composition checked according to technical data sheets information 2.4 Painting materials physical condition checked according to painting work requirements 2.5 Painting materials quantity calculated based on required painting area size 2.6 Painting materials mixing ratio identified according to painting work requirements

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	according to job requirements with awareness on health, safety and environmental requirements.	3. Set up painting equipment	3.1 Compression condition, parameters and fittings checked according to painting job requirements 3.2 Paint hose air less pump condition secured according to painting job requirements 3.3 Airless / Conventional spray condition checked for blockage prior start of painting operation 3.4 After cooler and air dryer system checked for parameters and fittings according to painting job requirements 3.5 Painting air manifold pressure gauge checked for health and safety requirements 3.6 All connections and fittings secured to avoid leakage and equipment damage during painting operation 3.7 Touch up painting tools cleanliness and functionality checked for painting repair and touch up work requirements
		4. Carry out painting equipment servicing	4.1 Type of painting equipment identified for servicing 4.2 Painting equipment servicing guidelines identified according to manufacturer's specifications 4.3 Painting equipment checked for conditions, parameters and functionality according to manufacturer's specifications 4.4 Painting equipment's fittings and connections secured to minimise possible damages during painting operation 4.5 Worn out or defective parts replacement carried out or sent for repair according to manufacturer's specifications

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			4.6 Painting equipment servicing recorded for reference according to company working procedures
		5. Perform painting activity	5.1 Paint system type and specification identified and applied according to painting job requirements 5.2 Climatic condition requirements for painting operation identified and checked according to standard painting specifications 5.3 Non-required painting surface protected before painting operation start according to painting work layout diagram 5.4 Paint mixing work carried out according to paint mixing ratio requirements 5.5 Stripe coating must be applied before spraying at angles, sharp edges and welding lines for better corrosion protection 5.6 Surface profile to be painted visually checked for contamination or defects 5.7 Painting skills and technique applied as per painting work instructions and safety requirements 5.8 Wet Film Thickness (WFT) / Dry Film Thickness (DFT) on painted surfaces checked according to standard painting specifications 5.9 Painting work area housekeeping carried out in accordance with housekeeping work procedure

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		6. Perform painting finishing and small repairs	6.1 Incomplete painted area identified for finishing requirements according to painting work layout diagram 6.2 Type of painting defects identified for finishing and small repair requirements 6.3 Method of painting repair applied for finishing and small repairs according to job requirements 6.4 Touch up painting conducted manually to inaccessible painting area as per painting work layout diagram 6.5 Painted surfaces checked according to standard painting specifications and job requirements 6.6 Painting equipment, tools and work area housekeeping carried out in accordance with housekeeping work procedure
5. Blasting Material and Equipment Storage Handling F433-004-2:2018-C05	Blasting Material and Equipment Storage Handling describes the temporary storage requirement for blasting materials and equipment. The personnel who is competent in this CU shall be able to identify blasting material and equipment storage requirements at work place, execute blasting material transfer plan, perform blasting material labelling, execute blasting equipment transfer plan and perform blasting equipment labelling.	1. Identify blasting material and equipment storage requirements at work place	1.1 Personal Protective Equipment (PPE) applied according to working safety procedure requirements 1.2 Blasting material and equipment storage area availability checked for vacancy according to work procedure 1.3 Blasting material and equipment storage area size measured according to material storage requirement 1.4 Blasting material and equipment storage area location distance checked from work area 1.5 Blasting material and equipment storage area checked for safety and environment condition 1.6 Signage and barricade installed at material

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	The outcome from this CU is the blasting materials and equipment storage are handled for blasting operation according to job requirements with awareness on health, safety and environmental requirements.		and equipment storage area according to working safety procedure requirements
		2. Execute blasting material transfer plan	2.1 Blasting material storage requirement interpreted according to immediate superior instruction 2.2 Blasting materials determined for storage according to blasting job requirement 2.3 Blasting material transfer equipment applied according material transfer requirement 2.4 Blasting material transfer performed according to material transfer plan 2.5 Blasting material transfer recorded for reference according to job requirement
		3. Perform blasting material labelling	3.1 Blasting materials quantity, volume and type checked against list requirement 3.2 Blasting materials at temporary storage location arranged for easy access 3.3 Blasting materials labelled for reference according to blasting job requirement 3.4 Protection on storage blasting materials applied using appropriate barricade according to safety requirement 3.5 Blasting material labelling recorded for reference according to job requirement
		4. Execute blasting equipment transfer plan	4.1 Blasting equipment storage requirement interpreted according to immediate superior instruction 4.2 Blasting equipment determined for storage according to blasting job requirement

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			4.3 Blasting equipment transfer equipment applied according material transfer requirement 4.4 Blasting equipment transfer performed according to material transfer plan
		5. Perform blasting equipment labelling	5.1 Blasting equipment type checked against list 5.2 Blasting equipment at temporary storage location arranged for easy access 5.3 Blasting equipment labelled for reference according to blasting job requirement 5.4 Protection on storage blasting equipment applied using appropriate barricade according to safety requirement 5.5 Blasting equipment labelling recorded for reference according to job requirement

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
6. Painting Material and Equipment Storage Handling F433-004-2:2018-C06	Painting Material and Equipment Storage Handling describes the temporary storage requirement for painting materials and equipment. The personnel who is competent in this CU shall be able to identify painting material and equipment storage requirements at work place, execute painting material transfer plan, perform painting material labelling, execute painting equipment transfer plan and perform painting equipment labelling. The outcome from this CU is the painting materials and equipment storage are handled for painting operation according to job requirements with awareness on health, safety and environmental requirements.	1. Identify painting material and equipment storage requirements at work place	1.1 Personal Protective Equipment (PPE) applied according to working safety procedure requirements 1.2 Painting material and equipment storage area availability checked for vacancy according to work procedure 1.3 Painting material and equipment storage area size measured according to material storage requirement 1.4 Painting material and equipment storage area location distance checked from work area 1.5 Painting material and equipment storage area checked for safety and environment condition 1.6 Signage and barricade installed at material and equipment storage area according to working safety procedure requirements
		2. Execute painting material transfer plan	2.1 Painting material storage requirement interpreted according to immediate superior instruction 2.2 Painting materials determined for storage according to painting job requirement 2.3 Painting material transfer equipment applied according material transfer requirement 2.4 Painting material transfer performed according to material transfer plan 2.5 Painting material transfer recorded for reference according to job requirement

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		3. Perform painting material labelling	3.1 Painting materials quantity, volume and type checked against list 3.2 Painting materials at temporary storage location arranged for easy access 3.3 Painting materials labelled for reference according to painting job requirement 3.4 Protection on storage painting materials applied using appropriate barricade according to safety requirement 3.5 Painting material labelling recorded for reference according to job requirement
		4. Execute painting equipment transfer plan	4.1 Painting equipment storage requirement interpreted according to immediate superior instruction 4.2 Painting equipment determined for storage according to painting job requirement 4.3 Painting equipment transfer equipment applied according to material transfer requirement 4.4 Painting equipment transfer performed according to material transfer plan 4.5 Scheduled wastes material handling performed with safety requirements
		5. Perform painting equipment labelling	5.1 Painting equipment type checked against list requirement 5.2 Painting equipment at temporary storage location arranged for easy access 5.3 Painting equipment labelled for reference according to painting job requirement 5.4 Protection on storage painting equipment

CU TITLE& CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			applied using appropriate barricade according to safety requirement 5.5 Painting equipment labelling recorded for reference according to job requirement

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
7. Specialised Surface Cleaning Application (Elective) F433-004-2:2018-E01	Specialised Surface Cleaning Application describes the surface preparation method by using specialised equipment other than conventional blasting method to remove contaminants or paint before applying a protective coating on the surface. The personnel who is competent in this CU shall be able to interpret Surface Cleaning Job Safety Analysis or Permit To Work, set up specialised surface cleaning equipment and tools, carry out specialised surface cleaning equipment servicing, perform specialised surface cleaning activity and lastly perform surface cleaning finishing and small repairs. As the Specialised Surface Cleaning equipment operation involves handling of high pressurised equipments, the job safety procedures always are being highlighted to minimise potential safety and health hazards at work. The outcome of this CU is the specialised surface cleaning application are completed and	1. Interpret Surface Cleaning Job Safety Analysis or Permit To Work	1.1 Personal Protective Equipment (PPE) applied according to working safety procedure requirements 1.2 Scope of work identified according to surface cleaning operation work requirements 1.3 Hazards identified according to surface cleaning prior commencement of work 1.4 Equipment and tools operation checked for functionality and condition in compliance with job safety requirements 1.5 Safety equipment at work area checked for safety in compliance with job safety requirement 1.6 Blasting work area checked according to work layout diagram
		2. Set up specialised surface cleaning equipment and tools	2.1 Compression condition, parameters and fittings checked according to surface cleaning job requirements 2.2 Air pressure at nozzle checked for specification requirement 2.3 Specialised surface cleaning pot condition, parameters and fittings checked according to blasting job requirements 2.4 After cooler and air dryer system checked for parameters and fittings according to surface cleaning job requirements 2.5 All connections and fittings secured to avoid leakage and equipment damage during surface cleaning operation 2.6 Power tools equipment condition and settings checked according to surface

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	meet the standard surface cleaning specifications and job requirements with awareness on health, safety and environmental requirements.		cleaning job requirements 2.7 Blasting breathing air system checked for health and safety requirements
		3. Carry out specialised surface cleaning equipment servicing	3.1 Specialised surface cleaning equipment servicing guidelines identified according to manufacturer's specifications 3.2 Specialised surface cleaning equipment checked for conditions, parameters and functionality according to manufacturer's specifications 3.3 Specialised surface cleaning equipment's fittings and connections secured to minimise possible damages during blasting operation 3.4 Worn out or defective parts replacement carried out or sent for repair according to manufacturer's specifications 3.5 Specialised surface cleaning equipment servicing recorded for reference according to company working procedures
		4. Perform specialised surface cleaning activity	4.1 Climatic condition requirements for surface cleaning identified according to standard blasting specifications 4.2 Non-required blasting surface protected before surface cleaning start according to blasting work layout diagram 4.3 Blasting skills and technique applied as per surface cleaning work instructions and safety requirements 4.4 Blasted surface profile and degree of cleanliness checked according to standard blasting specifications 4.5 Blasting work area housekeeping carried out in accordance with housekeeping work

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			procedure
		5. Perform surface cleaning finishing and small repairs	5.1 Incomplete blasted area identified for finishing requirements 5.2 Type of blasting defects identified for finishing and small repairs 5.3 Method of repair applied for defects to remove contaminants from surface using power tooling according to work requirements 5.4 Blasting conducted manually using power tooling or hand tools to inaccessible blasting area as per blasting work layout diagram 5.5 Standard power tooling type, specifications and condition checked according to blasting requirements 5.6 Blasting work area housekeeping carried out in accordance with housekeeping work procedure

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
8. Specialised Protective Coating Application (Elective) F433-004-2:2018-E02	Specialised Protective Coating Application describes the activity to coat the surface using specialised method and techniques. This CU covers pre-coating, coating and post-coating activities. Specialised protective coating on surfaces serves as enhanced structural properties which can save lives and assets from damage caused by environmental factors. The personnel who is competent in this CU shall be able to interpret specialised protective coating Job Safety Analysis or Permit To Work, inspect specialised protective coating materials, set up specialised protective coating equipment, carry out specialised protective coating equipment servicing, perform specialised protective coating activity and perform specialised protective coating finishing and small repairs. As the specialised protective coating involves handling of high pressurised equipment, the job safety procedures always are being highlighted to minimise potential safety and health hazards at work. The outcome of this CU is the	1. Interpret specialised protective coating Job Safety Analysis or Permit To Work	1.1 Personal Protective Equipment (PPE) applied according to working safety procedure requirements 1.2 Scope of work identified according to specialised protective coating operation work requirements 1.3 Hazards identified according to specialised protective coating operation prior commencement of work 1.4 Equipment and tools operation checked for functionality and condition in compliance with job safety requirements 1.5 Safety equipment and work area checked for safety in compliance with job safety requirement 1.6 Specialised protective coating work area checked according to work layout diagram
		2. Inspect specialised protective coating materials	2.1 Type of specialised protective coating material identified according to standard coating work requirements 2.2 Specialised protective coating Material Safety Data Sheet (MSDS) and Technical Data Sheet(TDS)identified according to standard coating work safety requirements 2.3 Specialised protective coating material specifications and composition checked according to technical data sheets information 2.4 Specialised protective coating materials physical condition checked according to coating work requirements 2.5 Specialised protective coating materials quantity calculated based on required

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
	specialised protective coating are completed and meet the standard specialised protective coating specifications and job requirements with awareness on health, safety and environmental requirements.		coating area size 2.6 Specialised protective coating materials mixing ratio identified according to coating work requirements
		3. Set up specialised protective coating equipment	3.1 Compression condition, parameters and fittings checked according to specialised protective coating job requirements 3.2 Specialised protective coating equipment condition checked for blockage prior start of coating operation 3.3 After cooler and air dryer system checked for parameters and fittings according to coating job requirements 3.4 Coating air manifold pressure gauge checked for health and safety requirements 3.5 All connections and fittings secured to avoid leakage and equipment damage during coating operation 3.6 Touch up coating equipment prepared and checked for condition and quality
		4. Carry out specialised protective coating equipment servicing	4.1 Type of specialised protective coating equipment identified for servicing 4.2 Specialised protective coating equipment servicing guidelines identified according to manufacturer's specifications 4.3 Specialised protective coating equipment checked for conditions, parameters and functionality according to manufacturer's specifications 4.4 Relevant specialised protective coating equipment's fittings and connections secured to minimise possible damages

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			during coating operation 4.5 Worn out or defective parts replacement carried out or sent for repair according to manufacturer's specifications 4.6 Specialised protective coating equipment servicing recorded for reference according to company working procedures
		5. Perform specialised protective coating activity	5.1 Specialised protective coating system type and specification applied according to coating job requirements 5.2 Climatic condition requirements for coating operation identified according to standard coating specifications 5.3 Non-required coating surface protected before coating operation start according to coating work layout diagram 5.4 Specialised protective coating carried out according to standard operating procedure 5.5 Stripe coating must be applied before spraying at angles, sharp edges and welding lines for better corrosion protection 5.6 Surface profile to be coated visually checked for contamination or defects 5.7 Specialised protective coating skills and technique applied as per coating work instructions and safety requirements 5.8 Wet Film Thickness (WFT) / Dry Film Thickness (DFT) on painted surfaces checked according to standard specialised protective coating specifications 5.9 Specialised protective coating work area housekeeping carried out in accordance with housekeeping work procedure

CU TITLE & CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		6. Perform specialised protective coating finishing and small repairs	6.1 Incomplete coated area identified for finishing requirements according to coating work layout diagram 6.2 Type of coating defects identified for finishing and small repair requirements 6.3 Method of coating repair applied for finishing and small repairs according to job requirements 6.4 Touch up coating conducted manually to inaccessible painting area as per coating work layout diagram 6.5 Coated surfaces checked according to standard coating specifications and job requirements 6.6 Specialised protective coating equipment, tools and work area housekeeping carried out in accordance with housekeeping work procedure

CURRICULUM OF COMPETENCY UNIT

NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR:

BLASTING AND PAINTING OPERATION

LEVEL 2

15. Curriculum of Competency Unit

15.1. Blasting Equipment Preparation

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
COMPETENCY UNIT TITLE	BLASTING EQUIPMENT PREPARATION		
LEARNING OUTCOMES	The outcome of this competency unit is able to prepare the requirements for blasting operation respectively in terms of area, equipment and housekeeping. Upon completion of this competency unit, trainees shall be able to: 1. Prepare blasting work area 2. Set up blasting equipment 3. Perform blasting work area housekeeping		
TRAINING PRE-REQUISITE			
CU CODE	F433-004-2:2018-C01	NOSS LEVEL	TWO (2)

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Prepare blasting work area	1.1 Blasting work site requirement such as: • Daily equipment inspection • Hazards at site area • Barricades • Work signage • Common signage • Permit To Work • Equipment layout • Equipment set up • Health, Safety and Environmental (HSE) regulations	1.1 Determine blasting work site 1.2 Check blasting work site requirements 1.3 Apply PPE 1.4 Install signage and barricades 1.5 Cover equipment, devices, piping and gauges 1.6 Determine blasting work site hazards and unsafe conditions 1.7 Check blasting work area ventilation	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite	1.1 Blasting work site requirements explained according to health, safety and environmental requirements 1.2 Signage and barricades differentiated and selected for installation at required location 1.3 Appropriate protection method selected and the purpose of equipment, devices, piping and gauges protection described for safety precautions 1.4 Work site safety application explained and installed according to health, safety and

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	1.2 Blasting work safety procedures such as: • Safety briefing • Company requirement • Personal Protective Equipment (PPE) 1.3 Blasting work hazard identification such as: • Gas leak • Weather conditions • Working at height • Working at confined space • Rusty conditions • Slippery area (slip, trip and fall) 1.4 Equipment, devices, piping and gauges protection such as: • Types of protection methods for: - Instrument - Gauges - Cables - Electrical components - Valves and pipes - Detector and sensor - Safety equipment and components • Types of protection materials such as: - Heavy duty canvas	1.8 Set up blasting work site safety requirements 1.9 Execute blasting work site washing down procedure	• Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	environmental requirements 1.5 Blasting work area setup demonstrated and complied with health, safety and environmental requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	- Heavy duty tape - Others • Open drain / sewer 1.5 Blasting work area washing down procedure • Oil and grease removal • Salt contamination • Shell Fouling • Weed Fouling • Dust • Water • Loose coating			
2. Set up blasting equipment	2.1 Types of blasting equipment and functionality such as: • Air compressor • After cooler system • Blasting pot • Air manifold • Breathing air system • Blasting helmet • Air hose • Blast hose • Air feud hose • Dust collector • Ventilation equipment • Air blower • Others 2.2 Sample of manufacturer	2.1 Apply PPE 2.2 Check blasting equipment connections 2.3 Check blasting tools 2.4 Test blasting equipment functionality 2.5 Check and replace breathing air system filter 2.6 Determine blasting materials for transfer 2.7 Execute blasting materials transfer to work site 2.8 Check abrasive media level 2.9 Refill abrasive media 2.10 Refill compressor	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures	2.1 Blasting equipment and connections assembled at work site according to work safety requirements 2.2 Breathing air system setup and filter replacement demonstrated according to health and safety requirements 2.3 Blasting materials listed and transferred to the work area before blasting operation 2.4 Blasting equipment and setup requirements demonstrated according to blasting operation procedure

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	manual 2.3 Types of blasting materials such as: • None metallic (Minerals) • Metallic (Recyclable) • Natural products • Specialist products 2.4 Blasting materials transfer requirements such as: • Transfer methods • Transfer equipment • Transfer procedures 2.5 Abrasive media details: • Material Safety Data Sheet (MSDS) • Technical Data Sheet (TDS) • Specifications: - Density - Shape - Colour - Size - Wetness • Fill up quantity level requirement 2.6 Abrasive media refill procedure for: • Auto • Manual - Scoop - Bag loading	diesel	• Adhere to environmental requirements	

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	- Hooper 2.7 Compressor diesel refill procedure			
3. Perform blasting work area housekeeping	3.1 Equipment parts and tools cleaning method using: • Thinner • Air pressure • Chemical • Turpentine 3.2 Materials, tools and equipment storage area requirements such as: • Arrangement • Sunlight exposure • Heat exposure • Ventilation • Location • Cleanliness 3.3 Blasting work area housekeeping procedure including: • Tools • Equipment • Materials • Secure • Space • Scheduled wastes 3.4 Types of wastes and scheduled wastes such as: • Used abrasive materials	3.1 Clean blasting equipment parts 3.2 Store blasting materials, tools and equipment 3.3 Execute blasting work area housekeeping procedure 3.4 Dispose wastes and scheduled wastes 3.5 Check blasting work area condition	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	3.1 Blasting equipment parts cleanliness condition maintained as per housekeeping requirements 3.2 Blasting materials, tools and equipment arranged appropriately at respective storage area 3.3 Wastes and scheduled wastes isolated and labelled according to disposal guidelines 3.4 Blasting work area condition maintained as per housekeeping requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Used tools • Others 3.5 Wastes and scheduled wastes storage container such as: • Tank • Jumbo bag • Drum • Tray pallet 3.6 Wastes and scheduled wastes disposal requirements such as: • Disposal method • Segregation • Labelling • Scheduled waste code • Handling method • Disposal process			

Employability Skills

Core Abilities

- Please refer NCS-Core Abilities latest edition.

Social Values & Social Skills

- Please refer Handbook on Social Skills and Social Values in Technical Education and Vocational Training.

References for Learning Material Development

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2 Petronas Technical Standards. Technical Specification: September 2012. Protective Coatings and Linings. PTS 30.48.00.31.
3 Construction Industry Development Board (CIDB). 2009. Module Protective Coating, Blasting and Painting Level II. Antap Semenanjung
4 Construction Industry Development Board (CIDB). 2005. Module Protective Coating, Blasting and Painting Level II. Antap Semenanjung
5 World Centre For Materials Joining Technology. October 2012. Painting Inspection Grade 5A Blast Cleaning Preparation Operative. TWI Ltd, Training and Examination Services.
6 Institute of Materials Malaysia. Coating Quality Control Technician. Materials Technology Education.
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15.2. Painting Equipment Preparation

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
COMPETENCY UNIT TITLE	PAINTING EQUIPMENT PREPARATION		
LEARNING OUTCOMES	The outcome of this competency unit is able to prepare the requirements for painting operation respectively in terms of area, equipment and housekeeping. Upon completion of this competency unit, trainees shall be able to: 1. Prepare painting work area 2. Set up painting equipment 3. Perform painting work area housekeeping		
TRAINING PRE-REQUISITE			
CU CODE	F433-004-2:2018-C02	NOSS LEVEL	TWO (2)

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Prepare painting work area	1.1 Painting work site requirement such as: • Daily equipment inspection • Hazards at site area • Barricades • Work signage • Common signage • Permit To Work • Equipment layout • Equipment set up • Health, Safety and Environmental (HSE) regulations 1.2 Painting work safety	1.1 Determine painting work site 1.2 Check work site requirements 1.3 Apply PPE 1.4 Install signage and barricades 1.5 Cover equipment, devices, piping and gauges 1.6 Determine work site hazards and unsafe conditions 1.7 Check work area ventilation 1.8 Set up work site safety	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics	3.1 Painting work site requirements explained according to health, safety and environmental requirements 3.2 Signage and barricades differentiated and selected for installation at required location 3.3 Appropriate protection method selected and the purpose of equipment, devices, piping and gauges protection described for safety precautions 3.4 Work site safety application explained and installed according to health, safety and environmental requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	procedures such as: • Safety briefing • Company requirement • Personal Protective Equipment (PPE) 1.3 Painting hazard identification such as: • Gas leak • Weather conditions • Working at height • Working at confined space • Rusty conditions • Slippery area (slip, trip and fall) 1.4 Equipment, devices, piping and gauges protection such as: • Types of protection methods for: - Instrument - Gauges - Cables - Electrical components - Valves and pipes - Detector and sensor - Safety equipment and components • Types of protection materials such as: - Heavy duty canvas - Heavy duty tape	requirements 1.9 Execute work site washing down procedure	<u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	3.5 Painting work area setup demonstrated and complied with health, safety and environmental requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	- Others 1.5 Painting work area washing down procedure • Oil and grease removal • Salt contamination • Shell Fouling • Weed Fouling • Dust • Water • Loose coating			
2. Set up painting equipment	2.1 Types of painting equipment and functionality such as: • Air compressor • After cooler system • Air manifold • Breathing air system • Carbon dioxide monitor • Air hose • Air feud hose • Dust collector • Ventilation equipment • Air blower • Air less spray pump • Conventional spray pot 2.2 Painting equipment cleanliness criteria for:	2.1 Apply PPE 2.2 Check painting equipment connections 2.3 Test painting equipment functionality 2.4 Check painting tools condition and cleanliness 2.5 Protect painting area 2.6 Determine painting materials for transfer 2.7 Check painting materials and specifications 2.8 Execute painting materials transfer to work site 2.9 Refill compressor diesel	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	2.1 Painting equipment and connections assembled at work site according to work safety requirements 2.2 Painting materials and specifications listed and described according to painting work requirements 2.3 Painting area covered with appropriate protection method according to work requirement 2.4 Painting materials listed and transferred to the work area before painting operation 2.5 Painting equipment setup and demonstrated according to painting operation requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Unclogged • No paint residue 2.3 Painting area protection such as: • Types of protection methods for : - Instrument - Gauges - Cables - Electrical components - Valves and pipes - Detector and sensor - Safety equipment and components • Types of protection materials such as: - Heavy duty canvas - Tarpaulin canvas - Plastic sheets - Heavy duty tape - Others 2.4 Types of painting materials such as: • Low temperature paint • High temperature paint • Single pack paint • Water based paint • Oil based paint • Others 2.5 Painting materials transfer requirements			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	such as: • Transfer methods • Transfer equipment • Transfer procedures • Paint storage area • Paint mixing area 2.6 Painting materials: • Material Safety Data Sheet (MSDS) • Technical Data Sheet (TDS) • Specifications such as : - Colour - Viscosity - Batch number - Expiry date			
3. Perform painting work area housekeeping	3.1 Equipment parts and tools cleaning method using: • Thinner • Air pressure • Chemical • Turpentine 3.2 Materials, tools and equipment storage area requirements such as: • Arrangement • Sunlight exposure • Heat exposure • Ventilation	4.1 Clean painting equipment parts 4.2 Store painting materials, tools and equipment 4.3 Execute painting work area housekeeping procedure 4.4 Dispose wastes and scheduled wastes 4.5 Check painting work area condition	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics	4.1 Painting equipment parts cleanliness condition maintained as per housekeeping requirements 4.2 Painting materials, tools and equipment arranged appropriately at respective storage area 4.3 Wastes and scheduled wastes isolated and labelled according to disposal guidelines 4.4 Painting work area condition maintained as per housekeeping requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Location • Cleanliness 3.3 Painting work area housekeeping procedure including: • Tools • Equipment • Materials • Secure • Space • Scheduled wastes 3.4 Types of wastes and scheduled wastes such as: • Used abrasive materials • Residual paint • Used tools (roller, paint brush, gloves, cotton rug) • Others 3.5 Wastes and scheduled wastes storage container such as: • Tank • Jumbo bag • Drum • Tray pallet 3.6 Wastes and scheduled wastes disposal requirements such as: • Disposal method • Segregation		<u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Labelling • Scheduled waste code • Handling method • Disposal process			

Employability Skills

Core Abilities

- Please refer NCS-Core Abilities latest edition.

Social Values & Social Skills

- Please refer Handbook on Social Skills and Social Values in Technical Education and Vocational Training.

References for Learning Material Development

1 Construction Industry Development Board (CIDB). Module Protective Coating Blasting (PCB2). Akademi Binaan Malaysia.
2 Petronas Technical Standards. Technical Specification: September 2012. Protective Coatings and Linings. PTS 30.48.00.31.
3 Construction Industry Development Board (CIDB). 2009. Module Protective Coating, Blasting and Painting Level II. Antap Semenanjung
4 Construction Industry Development Board (CIDB). 2005. Module Protective Coating, Blasting and Painting Level II. Antap Semenanjung
5 World Centre For Materials Joining Technology. October 2012. Painting Inspection Grade 5A Blast Cleaning Preparation Operative. TWI Ltd, Training and Examination Services.
6 Institute of Materials Malaysia. Coating Quality Control Technician. Materials Technology Education.
7 Institute of Materials Malaysia. Protective Coating Technician. Materials Technology Education.

15.3. Abrasive Blasting Operation

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
COMPETENCY UNIT TITLE	ABRASIVE BLASTING OPERATION		
LEARNING OUTCOMES	The outcome of this competency unit is able to perform abrasive blasting operation with awareness on health, safety and environmental requirements. Upon completion of this competency unit, trainees shall be able to: 1. Interpret Blasting Job Safety Analysis or Permit To Work 2. Inspect blasting media 3. Set up blasting equipment 4. Carry out blasting equipment servicing 5. Perform blasting activity 6. Perform blasting finishing and small repairs		
TRAINING PRE-REQUISITE			
CU CODE	F433-004-2:2018-C03	NOSS LEVEL	TWO (2)

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Interpret Blasting Job Safety Analysis or Permit To Work	1.1 Blasting work safety procedures such as: • Safety briefing • Company requirement • Personal Protective Equipment (PPE) • Job Safety Analysis (JSA) • Permit To Work (PTW) 1.2 Blasting scope of work order:	1.1 Apply PPE 1.2 Determine blasting scope of work order 1.3 Determine work site hazards and unsafe conditions 1.4 Check work site safety requirements 1.5 Check equipment safety 1.6 Check safety equipment at work site 1.7 Check blasting work area layout	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and	1.1 Job Safety Analysis and Permit to Work listed and explained according to health, safety and environmental requirements 1.2 Work site hazards and unsafe conditions explained according to work health, safety and environmental requirements 1.3 Blasting scope of work order explained according to work procedure and requirements 1.4 Work site safety requirements explained as per health, safety

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Blasting area • Work pack (work order) • Work duration • Blasting procedure • Blasting standard 1.3 Blasting hazards identification such as : • Gas leak • Weather conditions • Working at height • Working at confined space • Rusty conditions • Slippery area (slip, trip and fall) 1.4 Blasting equipment and tools safety requirement in terms of : • Operation • Physical conditions - Cracked - Leak - Expand - Broken • Functionality • Expiry date 1.5 Safety equipment at work area such as: • Safety pin • Safety whip check • Fire extinguisher • Manila rope		safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	and environmental requirements 1.5 Blasting work area layout sketched and presented according to blasting work requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Emergency button (for compressor) • Others 1.6 Blasting work area inspection requirement such as : • Workplace layout diagram • Equipment layout • Equipment setup			
2. Inspect blasting media	2.1 Type of blasting media such as : • None metallic (Minerals) • Metallic (Recyclable) • Natural products 2.2 Abrasive media : • Material Safety Data Sheet (MSDS) • Technical Data Sheet (TDS) • Specifications such as: - Density - Shape - Colour - Size - Wetness • Fill up quantity level requirement 2.3 Abrasive media refill procedure for: • Auto	2.1 Determine type of blasting media 2.2 Check blasting media technical data and information 2.3 Examine physical condition of blasting media 2.4 Check blasting media quantity level 2.5 Refill blasting media	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	2.1 Type of blasting media distinguished and selected according to blasting work requirements 2.2 Blasting media technical data and information listed and described for blasting work requirements 2.3 Physical condition of blasting media described for blasting work 2.4 Blasting media replenished into blasting equipment up to the required quantity level and demonstrated safely

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Manual - Scoop - Bag loading - Hooper			
3. Set up blasting equipment	3.1 Types of blasting equipment and functionality such as: • Air compressor • After cooler system • Blasting pot • Air manifold • Breathing air system • Blasting helmet • Air hose • Blast hose • Air feud hose • Dust collector • Ventilation equipment • Air blower • Deadman switch (safety switch) • Others 3.2 Power tools equipment and functionality such as: • Drill • Grinder • Needle scaler 3.3 Hand tools and functionality such as :	3.1 Determine type of blasting equipment 3.2 Test blasting equipment connections 3.3 Set compression parameters 3.4 Set blasting pot parameters 3.5 Test blasting equipment functionality and safety 3.6 Determine type of power tooling 3.7 Check power tooling condition and functionality 3.8 Check breathing air system operation	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	3.1 Blasting equipment and connections assembled at work site according to work safety requirements 3.2 Blasting equipment operational parameter settings demonstrated according to blasting work requirements 3.3 Power tooling condition listed and selected according to blasting work requirements 3.4 Breathing air system setup demonstrated in accordance with health and safety requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Wire brush • Chipping hammer • Hard scrapper • Abrasive pad • Others			
4. Carry out blasting equipment servicing	4.1 Blasting equipment servicing method for: • Umbrella pot • Rubber seal • Gasket Coupling • Outlet valves • Nozzle • Deadman system • Air release filter blast pot • Compressor unit 4.2 Sample of manufacturer's manual including : • Components and parts • Parameters • Servicing requirement 4.3 Common blasting equipment defects and worn out such as : • Cracked • Leak • Expand • Broken • Others 4.4 Blasting equipment servicing record	4.1 Determine blasting equipment required servicing 4.2 Utilise blasting equipment servicing tools 4.3 Test blasting equipment functionality and conditions 4.4 Assess severity of blasting equipment defects 4.5 Execute blasting equipment cleaning 4.6 Determine worn out equipment to be repaired or replaced 4.7 Update blasting equipment servicing record 4.8 Update blasting equipment timesheet record	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	4.1 Blasting equipment to be serviced selected and demonstrated according to manufacturer's servicing guidelines 4.2 Worn out equipment listed for repair or replacement 4.3 Blasting equipment servicing and timesheet records filled in according to format

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	4.5 Blasting equipment timesheet record			
5. Perform blasting activity	5.1 Blasting climatic condition requirements such as : • Ambient temperature • Dew point temperature • Relative humidity • Surface temperature • Wet temperature 5.2 Blasting standards and codes such as: • White Metal Blast Cleaning (such as SA3, SSPC-SP-5, NACE 1) • Near-White Metal Blast Cleaning (such as SSPC-SP-10) • Commercial Blast Cleaning (such as SSPC-SP-6) • Brush-Off Blast Cleaning (such as SSPC-SP-7) • Degree of roughness (such as ISO 8503, ASTM D 4417) 5.3 Blasting area and equipment protection such as :	5.1 Check climatic conditions 5.2 Determine blasting standards 5.3 Cover non-required blasting surface area 5.4 Check area to be blasted 5.5 Blast surface 5.6 Use proper communication signal method for blasting pot operation 5.7 Check blasting surface profile 5.8 Determine surface degree of cleanliness 5.9 Execute work area housekeeping	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	5.1 Blasting standards and codes listed and described according to blasting work requirements 5.2 Surface blasting procedure demonstrated and achieved the standard blasting specifications 5.3 Blasted surface profile and degree of cleanliness explained and presented according to standard blasting specifications 5.4 Blasting work area housekeeping procedure demonstrated according to housekeeping requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Types of protection methods for : - Instrument - Gauges - Cables - Electrical components - Valves and pipes - Detector and sensor - Safety equipment and components • Types of protection materials such as : - Heavy duty canvas - Heavy duty tape - Others 5.4 Blasting skills and technique such as: • Full blast • Spot blast • Sweep blast • Re-blast 5.5 Blasting communication signal and operation signage such as: • Start • Stop • Top up abrasive media • Check abrasive media • Emergency • Re-flow air pressure			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	5.6 Surface profile visual inspection method 5.7 Blasting work area housekeeping requirements such as: • Tools • Equipment • Materials • Space • Procedure			
6. Perform blasting finishing and small repairs	6.1 Causes for incomplete blasted area such as: • Inaccessible area • Missed blasting • Blocked area • Sensitive equipment area • Dangerous area • Sensitive surface • Badly corroded surface • Equipment malfunction • Other 6.2 Type of blasting defects such as: • Surface condition - Imperfection - Roughness - Crack shell and seams • Hole	6.1 Check incomplete blast area 6.2 Determine type of blasting defects 6.3 Repair blasting defects 6.4 Blast surface manually 6.5 Check blasting surface profile 6.6 Execute work area housekeeping	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures	6.1 Causes of incomplete blast and blasting defects listed and described according to standard blasting specifications 6.2 Manual blasting procedure demonstrated and achieved the standard blasting specifications 6.3 Final blasted surface profile and degree of cleanliness explained and presented according to standard blasting specifications 6.4 Blasting work area housekeeping procedure demonstrated according to housekeeping requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Leak effect • Other 6.3 Causes for blasting defects such as: • Over blast • Wrong selection of abrasive media • Wrong selection of equipment • Low air pressure • High air pressure • Other 6.4 Method of blasting repair such as: • Re-blast • Power tooling: - Drill - Grinder - Needle scaler • Hand tools: - Wire brush - Chipping hammer - Hard scrapper - Abrasive pad 6.5 Standard Tool (ST) Improved Cleaning such as: • ST2 • ST3		• Adhere to environmental requirements	

Employability Skills

Core Abilities

- Please refer NCS-Core Abilities latest edition.

Social Values & Social Skills

- Please refer Handbook on Social Skills and Social Values in Technical Education and Vocational Training.

References for Learning Material Development

1 Construction Industry Development Board (CIDB). Module Protective Coating Blasting (PCB2). AkademiBinaan Malaysia.
2 Petronas Technical Standards. Technical Specification: September 2012. Protective Coatings and Linings. PTS 30.48.00.31.
3 Construction Industry Development Board (CIDB). 2009. Module Protective Coating, Blasting and Painting Level II. Antap Semenanjung
4 Construction Industry Development Board (CIDB). 2005. Module Protective Coating, Blasting and Painting Level II. Antap Semenanjung
5 World Centre For Materials Joining Technology. October 2012. Painting Inspection Grade 5A Blast Cleaning Preparation Operative. TWI Ltd, Training and Examination Services.
6 Institute of Materials Malaysia. Coating Quality Control Technician. Materials Technology Education.
7 Institute of Materials Malaysia. Protective Coating Technician. Materials Technology Education.

15.4. Protective Coating and Painting Operation

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
COMPETENCY UNIT TITLE	PROTECTIVE COATING AND PAINTING OPERATION		
LEARNING OUTCOMES	The outcome of this competency unit is able to perform protective coating and painting operation with awareness on health, safety and environmental requirements. Upon completion of this competency unit, trainees shall be able to: 1. Interpret painting Job Safety Analysis or Permit To Work 2. Inspect painting materials 3. Set up painting equipment 4. Carry out painting equipment servicing 5. Perform painting activity 6. Perform painting finishing and small repairs		
TRAINING PRE-REQUISITE			
CU CODE	F433-004-2:2018-C04	NOSS LEVEL	TWO (2)

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Interpret painting Job Safety Analysis or Permit To Work	1.1 Painting work safety procedures such as: • Safety briefing • Company requirement • Personal Protective Equipment (PPE) • Job Safety Analysis (JSA) • Permit To Work (PTW) 1.2 Painting scope of work	1.1 Apply PPE 1.2 Determine painting scope of work order 1.3 Determine work site hazards and unsafe conditions 1.4 Check work site safety requirements 1.5 Check equipment safety 1.6 Check safety equipment at work site 1.7 Check painting work area layout	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and	1.1 Job Safety Analysis and Permit to Work listed and explained according to health, safety and environmental requirements 1.2 Work site hazards and unsafe conditions explained according to work health, safety and environmental requirements 1.3 Painting scope of work order explained according to work procedure and requirements 1.4 Work site safety requirements explained as per health, safety

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	order: • Painting area • Work pack (work order) • Work duration • Painting procedure • Painting standard 1.3 Painting hazards identification such as: • Gas leak • Weather conditions • Working at height • Working at confined space • Rusty conditions • Slippery area (slip, trip and fall) 1.4 Painting equipment and tools safety requirement in terms of: • Operation • Physical conditions - Cracked - Leak - Expand - Broken • Functionality • Expiry date 1.5 Safety equipment at work area such as: • Safety pin • Safety whip check • Fire extinguisher		safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	and environmental requirements 1.5 Painting work area layout sketched and presented according to painting work requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Manila rope • Emergency button (for compressor) • Others 1.6 Painting work area inspection requirement such as : • Workplace layout diagram • Equipment layout • Equipment setup			
2. Inspect painting materials	2.1 Types of painting materials such as: • Low temperature paint • High temperature paint • Single pack paint • Two pack paint • Water based paint • Oil based paint • Others 2.2 Painting materials : • Material Safety Data Sheet (MSDS) • Technical Data Sheet (TDS) • Compositions • Specifications such as : - Colour - Viscosity	2.1 Determine type of painting materials 2.2 Check painting material technical data and information 2.3 Examine physical condition of painting materials 2.4 Identify required painting materials to be used 2.5 Determine painting material mixing ratio	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	2.1 Type of painting materials distinguished and selected according to painting work requirements 2.2 Painting materials technical data and information listed and described for painting work requirements 2.3 Physical condition of painting materials listed and described for painting work 2.4 Estimation of painting materials quantity calculated and explained according to painting work requirements 2.5 Painting materials mixing ratio calculated according to painting work requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	- Batch number - Expiry date - Shelf life - Pot life 2.3 Painting materials quantity calculation such as: • Square meter surface area • Material estimation • Formula 2.4 Painting materials mixing ratio requirements such as: • Two pack paint • Paint base (Part A) • Hardener (Part B) • Surface area 2.5 Painting materials storage and handling requirements such as: • Temperature • Ventilation • Systematic storage arrangement • Handling procedure			
3. Set up painting equipment	3.1 Types of painting equipment and functionality such as : • Air compressor • After cooler system • Air manifold	3.1 Determine type of painting equipment 3.2 Test painting equipment connections 3.3 Set compression parameters 3.4 Set after cooler and air	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions	3.1 Painting equipment and connections assembled at work site according to work safety requirements 3.2 Painting equipment operational parameter settings demonstrated according to painting work

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Breathing air system • Air hose • Air feud hose • Dust collector • Ventilation equipment • Air blower • Air less spray pump • Conventional spray pot 3.2 Touch up painting tools and functionality such as: • Roller • Paint brush • Others 3.3 Painting equipment cleanliness criteria for: • Unclogged • No paint residue	dryer system parameters 3.5 Check airless / conventional spray condition and functionality 3.6 Test painting equipment functionality and safety 3.7 Gather touch up painting tools 3.8 Check touch up painting tools condition and functionality	• Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	requirements 3.3 Touch up painting tools listed and selected according to painting work requirements 3.4 Touch up painting tools condition and functionality explained according to painting work requirements
4. Carry out painting equipment servicing	4.1 Painting equipment servicing method for: • Air less pump gun - Nozzle tip - Spray tip - Needle - Packing - Air regulator pump • Conventional spray gun: - Cap / Horn	4.1 Determine painting equipment required servicing 4.2 Utilise painting equipment servicing tools 4.3 Test painting equipment functionality and conditions 4.4 Assess severity of painting equipment defects	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite	4.1 Painting equipment to be serviced selected and demonstrated according to manufacturer's servicing guidelines 4.2 Worn out equipment listed for repair or replacement 4.3 Painting equipment servicing and timesheet records filled in according to format

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	- Nozzle - Needle - Valve control adjust - Air valve - Pattern valve - Paint hose fluid line • Compressor unit • Conventional pot - Agitator - Stirrer 4.2 Sample of manufacturer's manual including : • Components and parts • Parameters • Servicing requirement 4.3 Common painting equipment defects and worn out such as : • Cracked • Leak • Expand • Broken • Others 4.4 Painting equipment servicing record 4.5 Painting equipment timesheet record	4.5 Execute painting equipment cleaning 4.6 Determine worn out equipment to be repaired or replaced 4.7 Update painting equipment servicing record 4.8 Update painting equipment timesheet record	• Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	
5. Perform painting activity	5.1 Paint components: • Binder • Pigment • Solvent 5.2 Paint system types such	5.1 Check climatic conditions 5.2 Determine painting standards 5.3 Cover non-required painting surface	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions	5.1 Painting standards and codes listed and described according to painting work requirements 5.2 Painting procedure demonstrated and achieved the standard painting specifications

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	as : • Primer • Mid-coats • Finishing coats 5.3 Painting climatic condition requirements such as : • Ambient temperature • Dew point temperature • Relative humidity • Surface temperature • Wet temperature • Dry temperature 5.4 Painting standards requirements such as: • Wet Film Thickness (WFT) • Dry Film Thickness (DFT) • Technical standards: - Steel Structures Paint Council, SSPC (SP 5, 6, 7, 10) - National Association Corrosion Engineers, (NACE) - ASTM (D 4414, D 869, D 3359, D 4541, D 4752, D 610, D 4214, D 523, D 870, D 2485, D 3276, D 5064, D 5164, G 8)	5.4 Check area to be painted 5.5 Mix paint materials 5.6 Stripe coat the surface 5.7 Paint the required surface 5.8 Apply painting techniques 5.9 Check surface profile 5.10 Utilise surface profile inspection tools 5.11 Execute work area housekeeping	• Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	5.3 Painted surface profile explained and presented according to standard painting specifications 5.4 Painting work area housekeeping procedure demonstrated according to housekeeping requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	- ISO 8501:2007 - Swedish Std SIS 0559001967) - British Std BS4232 5.5 Painting area and equipment protection such as: • Types of protection methods for : - Instrument - Gauges - Cables - Electrical components - Valves and pipes - Detector and sensor - Safety equipment and components • Types of protection materials such as : - Heavy duty canvas - Tarpaulin canvas - Plastic sheets - Heavy duty tape - Others 5.6 Paint mixing work requirements: • Mixing tank • Mixing tools and equipment • Mixing procedure 5.7 Stripe coating			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	requirement : • Angles • Free and sharp edges • Inside and edges of holes • Welding lines • Inaccessible painting area 5.8 Surface profile visual inspection for: • Contamination • Blasting defects 5.9 Surface profile inspection tools : • Magnifying Glass • Adhesive Tape (ISO 8502-3) • Surface Comparator • Wet Thickness Gauge • Digital Profile Gauge • Dry Film Thickness Gauge (DFT Gauge) • Pull Off Adhesion Tester • Hydraulic Adhesion Tester • Magnetic Pull Off Gauge • Whirling Hygrometer • Wet Sponge Pin Hole Detector • DC Holiday Detector • Cross Cut			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• X Cut • Salt Contamination Tester • Dew Point Calculator • Magnetic Steel Thermometer 5.10 Painting skills and technique such as: • Conventional spray technique • Airless spraying technique • Parallel spraying • Perpendicular spraying • Arching spraying • Tilting spraying • Overlapping technique • Fan adjustment • Pattern spraying • Spraying distance • Brush painting • Roller painting 5.11 Common paint application defects and causes such as: • Dry spray • Over thickness • Hiding • Sagging • Wrinkling • Not dry			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Orange peel • Brush mark • Bleeding • Failure-paint • Pinhole and pores 5.12 Common paint defects and causes such as: • Flaking • Delamination • Undercut • Blister • Pinhole • Bleeding • Alligator • Fish eye • Flaking • Impact damage 5.13 Painting work area housekeeping requirements such as: • Tools • Equipment • Materials • Space • Procedure • Paint storage • Scheduled wastes			
6. Perform painting finishing and small repairs	6.1 Causes for incomplete painted area such as: • Inaccessible area • Missed spray	6.1 Check incomplete paint area 6.2 Determine type of painting defects	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard	6.1 Causes of incomplete paint and painting application defects listed and described according to standard painting specifications

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Blocked area • Sensitive equipment area • Dangerous area • Sensitive surface • Equipment malfunction • Other 6.2 Method of painting defects repair such as: • Re-blast: - Full blast - Spot blast - Sweep blast • Power tooling: - Drill - Grinder - Needle scaler • Hand tools: - Wire brush - Chipping hammer - Hard scrapper - Abrasive pad - Roller - Paint brush	6.3 Repair paint and painting application defects 6.4 Paint incomplete surface manually 6.5 Check final painted surface profile 6.6 Execute work area housekeeping	operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	6.2 Manual painting procedure demonstrated and achieved the standard painting specifications 6.3 Final painted surface profile explained and presented according to standard blasting specifications 6.4 Painting work area housekeeping procedure demonstrated according to housekeeping requirements

Employability Skills

Core Abilities

- Please refer NCS-Core Abilities latest edition.

Social Values & Social Skills

- Please refer Handbook on Social Skills and Social Values in Technical Education and Vocational Training.

References for Learning Material Development

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2 Petronas Technical Standards. Technical Specification: September 2012. Protective Coatings and Linings. PTS 30.48.00.31.
3 Construction Industry Development Board (CIDB). 2009. Module Protective Coating, Blasting and Painting Level II.Antap Semenanjung
4 Construction Industry Development Board (CIDB). 2005. Module Protective Coating, Blasting and Painting Level II.Antap Semenanjung
5 World Centre For Materials Joining Technology. October 2012. Painting Inspection Grade 5A Blast Cleaning Preparation Operative. TWI Ltd, Training and Examination Services.
6 Institute of Materials Malaysia. Coating Quality Control Technician. Materials Technology Education.
7 Institute of Materials Malaysia. Protective Coating Technician. Materials Technology Education.

15.5. Blasting Material and Equipment Storage Handling

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
COMPETENCY UNIT TITLE	BLASTING MATERIAL AND EQUIPMENT STORAGE HANDLING		
LEARNING OUTCOMES	The outcome of this competency unit is able to perform blasting materials and equipment storage with awareness on health, safety and environmental requirements. Upon completion of this competency unit, trainees shall be able to: 1. Identify blasting material and equipment storage requirements at work place 2. Execute blasting material transfer plan 3. Perform blasting material labelling 4. Execute blasting equipment transfer plan 5. Perform blasting equipment labelling		
TRAINING PRE-REQUISITE			
CU CODE	F433-004-2:2018-C05	NOSS LEVEL	TWO (2)

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Identify blasting material and equipment storage requirements at work place	1.1 Blasting temporary storage requirements such as: • Storage area condition • Area availability • Required area site • Air ventilation • Signage and barricade 1.2 Blasting work safety procedures such as: • Safety briefing • Company requirement • Personal Protective Equipment (PPE)	1.1 Apply PPE 1.2 Check blasting temporary storage availability 1.3 Communicate with respective personnel for storage location vacancy 1.4 Check storage area condition and environment 1.5 Secure storage area signage and barricade	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and	1.1 Blasting temporary storage requirements explained according to job requirement 1.2 The required storage area size calculated according to storage requirement 1.3 Signage and barricades differentiated and selected to secure the temporary storage location 1.4 1.5

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
			safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	
2. Execute blasting material transfer plan	2.1 Blasting materials checklist such as: • Quantity • Condition • Storage 2.2 Blasting material transfer equipment 2.3 Blasting material transfer procedure 2.4 Blasting material transfer recording	2.1 Inspect blasting materials condition 2.2 Conduct blasting materials transfer to temporary storage location 2.3 Arrange blasting material at temporary storage area 2.4 Update blasting material transfer checklist	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	2.1 Blasting material storage requirement explained according to blasting job requirement 2.2 Blasting material transfer task summarised according to priority and storage requirements 2.3 Blasting materials transfer checklist filled in according to blasting job requirements 2.4 Blasting materials temporary storage arrangement categorised and explained according to blasting work requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
3. Perform blasting material labelling	3.1 Blasting material checklist at storage area such as: • Quantity • Volume • Type of materials 3.2 Blasting material protection at storage area such as: • Ease of access • Labelling requirements • Protection materials and method • Signage and barricades Storage labelling	3.1 Determine blasting materials type for temporary storage 3.2 Apply blasting materials labelling 3.3 Check blasting materials arrangement at storage area 3.4 Protect blasting materials using appropriate method 3.5 Record stored blasting materials	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness • Communicate or negotiate with QC personnel SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	3.1 Blasting materials stored and labelled at temporary storage location according to blasting operation requirement
4. Execute blasting equipment transfer plan	4.1 Blasting equipment storage protection method for: • Instrument • Gauges • Cables • Electrical components • Valves and pipes • Detector and sensor • Safety equipment and components	4.1 Inspect blasting equipment condition 4.2 Conduct blasting equipment transfer to temporary storage location 4.3 Arrange blasting equipment at temporary storage area 4.4 Update blasting equipment transfer	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness • Communicate with authorised personnel	4.1 Blasting equipment storage requirement explained according to blasting job requirement 4.2 Blasting equipment transfer task summarised according to priority and storage requirements 4.3 Blasting equipment storage arrangement categorised and explained according to blasting job requirements 4.4 Blasting equipment transfer

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	4.2 Blasting equipment storage protection method materials such as: • Heavy duty canvas • Tarpaulin canvas • Plastic sheets • Heavy duty tape • Others 4.3 Blasting equipment transfer procedure 4.4 Blasting material transfer recording	record and checklist	SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	checklist filled in according to blasting job requirements
5. Perform blasting equipment labelling	5.1 Blasting equipment checklist at storage area 5.2 Blasting equipment protection at storage such as: • Ease of access • Labelling requirements • Protection materials and method • Signage and barricades • Storage labelling	5.1 Determine type of blasting equipment for storage 5.2 Apply blasting equipment labelling 5.3 Check blasting equipment arrangement at storage 5.4 Protect blasting equipment using appropriate method 5.5 Record stored equipment	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness • Communicate or negotiate with QC personnel SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures	5.1 Blasting equipment stored and labelled at temporary storage location according to painting operation requirement

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
			• Adhere to environmental requirements	

Employability Skills

Core Abilities

- Please refer NCS-Core Abilities latest edition.

Social Values & Social Skills

- Please refer Handbook on Social Skills and Social Values in Technical Education and Vocational Training.

References for Learning Material Development

1 Construction Industry Development Board (CIDB). Module Protective Coating Blasting (PCB2). Akademi Binaan Malaysia.
2 Petronas Technical Standards. Technical Specification: September 2012. Protective Coatings and Linings. PTS 30.48.00.31.
3 Construction Industry Development Board (CIDB). 2009. Module Protective Coating, Blasting and Painting Level II.Antap Semenanjung
4 Construction Industry Development Board (CIDB). 2005. Module Protective Coating, Blasting and Painting Level II.Antap Semenanjung
5 World Centre For Materials Joining Technology. October 2012. Painting Inspection Grade 5A Blast Cleaning Preparation Operative. TWI Ltd, Training and Examination Services.
6 Institute of Materials Malaysia. Coating Quality Control Technician. Materials Technology Education.
7 Institute of Materials Malaysia. Protective Coating Technician. Materials Technology Education.

15.6. Painting Material And Equipment Storage Handling

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
COMPETENCY UNIT TITLE	PAINTING MATERIAL AND EQUIPMENT STORAGE HANDLING		
LEARNING OUTCOMES	The outcome of this competency unit is able to perform painting materials and equipment storage with awareness on health, safety and environmental requirements. Upon completion of this competency unit, trainees shall be able to: 1. Identify painting material and equipment storage requirements at work place 2. Execute painting material transfer plan 3. Perform painting material labelling 4. Execute painting equipment transfer plan 5. Perform painting equipment labelling		
TRAINING PRE-REQUISITE			
CU CODE	F433-004-2:2018-C06	NOSS LEVEL	TWO (2)

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Identify painting material and equipment storage requirements at work place	1.1 Painting temporary storage requirements such as: • Storage area condition • Area availability • Required area size • Air ventilation • Signage and barricade 1.2 Painting work safety procedures such as: • Safety briefing • Company	1.1 Apply PPE 1.2 Check painting temporary storage availability 1.3 Communicate with respective personnel for storage location vacancy 1.4 Measure required storage area 1.5 Check storage area condition and environment 1.6 Secure storage area	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and	1.1 Painting temporary storage requirements explained according to job requirements 1.2 The required storage area size calculated according to storage requirement 1.3 Signage and barricades differentiated and selected to secure the temporary storage location

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	requirement • Personal Protective Equipment (PPE)	using signage and barricade	safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	
2. Execute painting material transfer plan	2.1 Painting materials checklist such as: • Quantity • Condition • Storage 2.2 Painting material transfer equipment 2.3 Painting material transfer procedure 2.4 Painting material transfer recording	2.1 Inspect painting materials condition 2.2 Conduct painting materials transfer to temporary storage location 2.3 Arrange painting material at temporary storage area 2.4 Update painting material transfer record and checklist	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	2.1 Painting material storage requirement explained according to painting job requirement 2.2 Painting material transfer task summarised according to priority and storage requirements 2.3 Material storage arrangement categorised and explained according to painting job requirements 2.4 Painting materials transfer checklist filled in according to painting job requirements
3. Perform painting material labelling	3.1 Painting material checklist at storage area such as: • Quantity	3.1 Determine painting materials type for temporary storage 3.2 Apply painting materials labelling	ATTITUDE • Comply with legislative requirements • Follow work standard	3.1 Painting materials stored and labelled at temporary storage location according to painting operation requirement

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Volume • Type of materials 3.2 Painting material protection at storage area such as: • Ease of access • Labelling requirements • Protection materials and method • Signage and barricades • Storage labelling 3.3 Wastes and scheduled wastes labelling requirements such as: • Tagging • Segregation • Authorised personnel	3.3 Check painting materials arrangement at storage area 3.4 Protect painting materials using appropriate method 3.5 Record stored painting materials	operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	
4. Execute painting equipment transfer plan	4.1 Painting equipment storage protection method for: • Instrument • Gauges • Cables • Electrical components • Valves and pipes • Detector and sensor • Safety equipment and components 4.2 Painting equipment	4.1 Inspect painting equipment condition 4.2 Conduct painting equipment transfer to temporary storage location 4.3 Arrange painting equipment at temporary storage area 4.4 Update painting equipment transfer record and checklist	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness • Communicate with authorised personnel SAFETY • Safety cautious at the worksite	4.1 Painting equipment storage requirement explained according to painting job requirement 4.2 Painting equipment transfer task summarised according to priority and storage requirements 4.3 Painting equipment storage arrangement categorised and explained according to painting job requirements 4.4 Painting equipment transfer checklist filled in according to painting job requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	storage protection method materials such as: • Heavy duty canvas • Tarpaulin canvas • Plastic sheets • Heavy duty tape • Others 4.3 Painting equipment transfer procedure 4.4 Painting material transfer recording		• Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	
5. Perform painting equipment labelling	5.1 Painting equipment checklist at storage area such as: • Type • Quantity 5.2 Painting equipment protection at storage such as: • Ease of access • Labelling requirements • Protection materials and method • Signage and barricades • Storage labelling	5.1 Determine type of painting equipment for storage 5.2 Apply painting equipment labelling 5.3 Check painting equipment arrangement at storage area 5.4 Protect painting equipment using appropriate method 5.5 Record stored equipment	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness • Communicate with all team members and safety personnel • SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics	5.1 Painting equipment stored and labelled at temporary storage location according to painting operation requirement

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
			ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	

Employability Skills

Core Abilities

- Please refer NCS-Core Abilities latest edition.

Social Values & Social Skills

- Please refer Handbook on Social Skills and Social Values in Technical Education and Vocational Training.

References for Learning Material Development

1 Construction Industry Development Board (CIDB). Module Protective Coating Blasting (PCB2). Akademi Binaan Malaysia.
2 Petronas Technical Standards. Technical Specification: September 2012. Protective Coatings and Linings. PTS 30.48.00.31.
3 Construction Industry Development Board (CIDB). 2009. Module Protective Coating, Blasting and Painting Level II.Antap Semenanjung
4 Construction Industry Development Board (CIDB). 2005. Module Protective Coating, Blasting and Painting Level II.Antap Semenanjung
5 World Centre For Materials Joining Technology. October 2012. Painting Inspection Grade 5A Blast Cleaning Preparation Operative. TWI Ltd, Training and Examination Services.
6 Institute of Materials Malaysia. Coating Quality Control Technician. Materials Technology Education.
7 Institute of Materials Malaysia. Protective Coating Technician. Materials Technology Education.

15.7. Specialised Surface Cleaning Application

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
COMPETENCY UNIT TITLE	SPECIALISED SURFACE CLEANING APPLICATION		
LEARNING OUTCOMES	The outcome of this competency unit is able to perform specialised surface cleaning applicationwith awareness on health, safety and environmental requirements. Upon completion of this competency unit, trainees shall be able to: 1. Interpret Surface Cleaning Job Safety Analysis or Permit To Work 2. Set up specialised surface cleaning equipment and tools 3. Carry out specialised surface cleaning equipment servicing 4. Perform specialised surface cleaning activity 5. Perform surface cleaning finishing and small repairs		
TRAINING PRE-REQUISITE			
CU CODE	F433-004-2:2018-E01	NOSS LEVEL	THREE (3)

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Interpret Surface Cleaning Job Safety Analysis or Permit To Work	1.1 Type of specialised surface cleaning application such as: • High pressure water jetting • Wet blasting • Vacuum blasting 1.2 Specialised surface cleaning work safety procedures such as: • Safety briefing • Company requirement	1.1 Apply PPE 1.2 Determine specialised surface cleaning scope of work order 1.3 Determine work site hazards and unsafe conditions 1.4 Check work site safety requirements 1.5 Check equipment safety 1.6 Check safety equipment at work site 1.7 Check specialised surface cleaning work	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and	1.1 Job Safety Analysis and Permit to Work listed and explained according to health, safety and environmental requirements 1.2 Work site hazards and unsafe conditions explained according to work health, safety and environmental requirements 1.3 Specialised surface cleaning application scope of work order explained according to work procedure and requirements 1.4 Work site safety requirements explained as per health, safety

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Personal Protective Equipment (PPE) • Job Safety Analysis (JSA) • Permit To Work (PTW) 1.3 Specialised surface cleaning scope of work order: • Blasting area • Work pack (work order) • Work duration • Blasting procedure • Blasting standard 1.4 Specialised surface cleaning hazards identification such as: • Gas leak • Weather conditions • Working at height • Working at confined space • Rusty conditions 1.5 Slippery area (slip, trip and fall) 1.6 Specialised surface cleaning equipment and tools safety requirement in terms of: • Operation • Physical conditions	area layout	safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	and environmental requirements 1.5 Specialised surface cleaning work area layout sketched and presented according to blasting work requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	- Cracked - Leak - Expand - Broken • Functionality • Expiry date 1.7 Safety equipment at work area such as: • Safety pin • Safety whip check • Fire extinguisher • Manila rope • Emergency button (for compressor) • Others 1.8 Specialised surface cleaning work area inspection requirement such as: • Workplace layout diagram • Equipment layout • Equipment setup			
2. Set up specialised surface cleaning equipment and tools	2.1 Types of specialised surface cleaning equipment and functionality for: • High pressure water jetting • Wet blasting • Vacuum blasting 2.2 Breathing air system functionality and	2.1 Determine type of specialised surface cleaning equipment 2.2 Test specialised surface cleaning equipment connections 2.3 Set specialised surface cleaning equipment parameters 2.4 Test equipment functionality and safety	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the	2.1 Specialised surface cleaning equipment and connections assembled at work site according to work safety requirements 2.2 Specialised surface cleaning equipment operational parameter settings demonstrated according to surface cleaning work requirements 2.3 Power tooling condition listed and selected according to surface

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	operation 2.3 Power tools equipment and functionality such as: • Drill • Grinder • Needle scaler 2.4 Hand tools and functionality such as : • Wire brush • Chipping hammer • Hard scrapper • Abrasive pad • Others	2.5 Determine type of power tooling 2.6 Check power tooling condition and functionality 2.7 Check breathing air system operation	worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures • Adhere to environmental requirements	cleaning work requirements 2.4 Breathing air system setup demonstrated in accordance with health and safety requirements
3. Carry out specialised surface cleaning equipment servicing	3.1 Specialised surface cleaning equipment servicing method for: • High pressure water jetting equipment • Wet blasting equipment • Vacuum blasting equipment 3.2 Sample of manufacturer's manual including: • Components and parts • Parameters • Servicing requirement 3.3 Common specialised	3.1 Determine specialised surface cleaning equipment required servicing 3.2 Utilise specialised surface cleaning equipment servicing tools 3.3 Test equipment functionality and conditions 3.4 Assess severity of equipment defects 3.5 Execute equipment cleaning 3.6 Determine worn out equipment to be repaired or replaced 3.7 Update specialised	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping procedures	3.1 Specialised surface cleaning equipment to be serviced selected and demonstrated according to manufacturer's servicing guidelines 3.2 Worn out equipment listed for repair or replacement 3.3 Specialised surface cleaning equipment servicing and timesheet records filled in according to format

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	surface cleaning equipment defects and worn out such as: • Cracked • Leak • Expand • Broken • Others 3.4 Specialised surface cleaning equipment servicing record 3.5 Specialised surface cleaning equipment timesheet record	surface cleaning equipment servicing record 3.8 Update specialised surface cleaning equipment timesheet record	• Adhere to environmental requirements	
4. Perform specialised surface cleaning activity	4.1 Specialised surface cleaning climatic condition requirements such as: • Ambient temperature • Dew point temperature • Relative humidity • Surface temperature • Wet temperature 4.2 Specialised surface cleaning application standards and codes such as: • High pressure water jetting: - SSPC	4.1 Check climatic conditions 4.2 Determine specialised surface cleaning standards 4.3 Cover non-required surface cleaning area 4.4 Check area to be blasted 4.5 Execute surface cleaning procedure as per specialised equipment operation: • High pressure water jetting equipment • Wet blasting equipment	ATTITUDE • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness SAFETY • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics ENVIRONMENT • Adhere housekeeping	4.1 Specialised surface cleaning application standards and codes listed and described according to surface cleaning work requirements 4.2 Surface blasting procedure demonstrated and achieved the standard specialised surface cleaning application specifications 4.3 Completed surface profile and degree of cleanliness explained and presented according to standard specialised surface cleaning application specifications 4.4 Specialised surface cleaning

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	- ISO 8591-1 - NACE • Wet blasting - SP12 - NACE No.5 • Vacuum blasting - White Metal Blast Cleaning (such as SA3, SSPC-SP-5, NACE 1) - Near-White Metal Blast Cleaning (such as SSPC-SP-10) - Commercial Blast Cleaning (such as SSPC-SP-6) - Brush-Off Blast Cleaning (such as SSPC-SP-7) - Degree of roughness (such as ISO 8503, ASTM D 4417) 4.3 Specialised surface cleaning area and equipment protection such as : • Types of protection methods for : - Instrument - Gauges - Cables - Electrical	• Vacuum blasting equipment 4.6 Use communication signal method for surface cleaning equipment operation 4.7 Check surface profile 4.8 Determine surface degree of cleanliness 4.9 Execute work area housekeeping	procedures • Adhere to environmental requirements	work area housekeeping procedure demonstrated according to housekeeping requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	components - Valves and pipes - Detector and sensor - Safety equipment and components • Types of protection materials such as : - Heavy duty canvas - Heavy duty tape - Others 4.4 Specialised surface cleaning skills and technique 4.5 Surface profile visual inspection method 4.6 Specialised surface cleaning work area housekeeping requirements such as: • Tools • Equipment • Materials • Space • Procedure			
5. Perform surface cleaning finishing and small repairs	5.1 Causes for incomplete area such as: • Inaccessible area • Missed blasting • Blocked area • Sensitive equipment area • Dangerous area • Sensitive surface • Badly corroded	5.1 Check incomplete area 5.2 Determine type of surface cleaning defects 5.3 Repair surface cleaning defects 5.4 Blast surface manually 5.5 Check surface profile 5.6 Execute work area housekeeping	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the	5.1 Causes of incomplete area and defects listed and described according to standard surface cleaning specifications 5.2 Manual blasting procedure demonstrated and achieved the standard blasting specifications 5.3 Final surface profile and degree of cleanliness explained and presented according to standard

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	surface • Equipment malfunction • Other 5.2 Type of surface cleaning defects such as: • Surface condition - Imperfection - Roughness - Crack shell and seams • Hole • Leak effect 5.3 Causes for surface cleaning defects such as: • Over blast • Wrong selection of abrasive media • Wrong selection of equipment • Low air pressure • High air pressure 5.4 Method of repair such as: • Re-blast • Power tooling: - Drill - Grinder - Needle scaler • Hand tools: - Wire brush - Chipping hammer - Hard scrapper - Abrasive pad		worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	surface cleaning specifications 5.4 Surface cleaning work area housekeeping procedure demonstrated according to housekeeping requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	5.5 Standard Tool (ST) Improved Cleaning such as: • ST2 • ST3			

Employability Skills

Core Abilities

- Please refer NCS-Core Abilities latest edition.

Social Values & Social Skills

- Please refer Handbook on Social Skills and Social Values in Technical Education and Vocational Training.

References for Learning Material Development

1 Construction Industry Development Board (CIDB). Module Protective Coating Blasting (PCB2). AkademiBinaan Malaysia.
2 Petronas Technical Standards. Technical Specification: September 2012. Protective Coatings and Linings. PTS 30.48.00.31.
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4 Construction Industry Development Board (CIDB). 2005. Module Protective Coating, Blasting and Painting Level II.Antap Semenanjung
5 World Centre For Materials Joining Technology. October 2012. Painting Inspection Grade 5A Blast Cleaning Preparation Operative. TWI Ltd, Training and Examination Services.
6 Institute of Materials Malaysia. Coating Quality Control Technician. Materials Technology Education.
7 Institute of Materials Malaysia. Protective Coating Technician. Materials Technology Education.

15.8. Specialised Protective Coating Application

SECTION	(F) CONSTRUCTION		
GROUP	(43) SPECIALISED CONSTRUCTION ACTIVITIES		
AREA	BLASTING AND PAINTING OPERATION		
NOSS TITLE	BLASTING AND PAINTING OPERATION		
COMPETENCY UNIT TITLE	SPECIALISED PROTECTIVE COATING APPLICATION		
LEARNING OUTCOMES	The outcome of this competency unit is able to perform specialised protective coating application with awareness on health, safety and environmental requirements. Upon completion of this competency unit, trainees shall be able to: 1. Interpret specialised protective coating Job Safety Analysis or Permit To Work 2. Inspect specialised protective coating materials 3. Set up specialised protective coating equipment 4. Carry out specialised protective coating equipment servicing 5. Perform specialised protective coating activity 6. Perform specialised protective coating finishing and small repairs		
TRAINING PRE-REQUISITE			
CU CODE	F433-004-2:2018-E02	NOSS LEVEL	THREE (3)

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
1. Interpret specialised protective coating Job Safety Analysis or Permit To Work	1.1 Specialised protective coating work safety procedures such as : • Safety briefing • Company requirement • Personal Protective Equipment (PPE) • Job Safety Analysis (JSA) • Permit To Work (PTW) 1.2 Specialised protective	1.1 Apply PPE 1.2 Determine specialised protective coating scope of work order 1.3 Determine work site hazards and unsafe conditions 1.4 Check work site safety requirements 1.5 Check equipment safety 1.6 Check safety equipment at work site 1.7 Check specialised	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and	1.1 Job Safety Analysis and Permit to Work listed and explained according to health, safety and environmental requirements 1.2 Work site hazards and unsafe conditions explained according to work health, safety and environmental requirements 1.3 Specialised protective coating scope of work order explained according to work procedure and requirements 1.4 Work site safety requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	coating scope of work order : • Painting area • Work pack (work order) • Work duration • Painting procedure • Painting standard 1.3 Specialised protective coating hazards identification such as : • Gas leak • Weather conditions • Working at height • Working at confined space • Rusty conditions • Slippery area (slip, trip and fall) 1.4 Specialised protective coating equipment and tools safety requirement in terms of : • Operation • Physical conditions - Cracked - Leak - Expand - Broken • Functionality • Expiry date 1.5 Safety equipment at work area such as:	protective coating work area layout	safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	explained as per health, safety and environmental requirements 1.5 Specialised protective coating work area layout sketched and presented according to work requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Safety pin • Safety whip check • Fire extinguisher • Manila rope • Emergency button (for compressor) • Others 1.6 Specialised protective coating work area inspection requirement such as : • Workplace layout diagram • Equipment layout • Equipment setup			
2. Inspect specialised protective coating materials	2.1 Specialised protective coating application and materials such as: • Passive Fire Protective Coating • Thermal Metal Spray Coating • Fusion Bonded Epoxy Coating • Bituminous Enamel Coating • Concrete Coating • Ceramic Coating • Elastomer Coating • External Polyethylene and Polypropylene Coating	2.1 Determine type of specialised protective coating materials 2.2 Check specialised protective coating material technical data and information 2.3 Examine physical condition of specialised protective coating materials 2.4 Identify required specialised protective coating materials to be used 2.5 Determine specialised protective coating material mixing ratio	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping	2.1 Type of specialised protective coating materials distinguished and selected according to coating work requirements 2.2 Specialised protective coating materials technical data and information listed and described for coating work requirements 2.3 Physical condition of specialised protective coating materials listed and described for coating work 2.4 Estimation of specialised protective coating materials quantity calculated and explained according to coating work requirements 2.5 Specialised protective coating materials mixing ratio calculated

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Subsea Coating • Lining Coating such as: - Cement coating - Glass flake coating - Rubber coating - Thermoplastic coating • Surface treatment and PTFE Coating 2.2 Specialised protective coating materials technical data such as: • Material Safety Data Sheet (MSDS) • Technical Data Sheet (TDS) • Compositions • Specifications such as: - Colour - Viscosity - Batch number - Expiry date 2.3 Specialised protective coating materials quantity calculation such as: • Square meter surface area • Material estimation • Formula 2.4 Specialised protective coating materials mixing		procedures • Adhere to environmental requirements	according to coating work requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	ratio requirement 2.5 Specialised protective coating materials storage and handling requirements such as: • Temperature • Ventilation • Systematic storage arrangement • Handling procedure			
3. Set up specialised protective coating equipment	3.1 Types of equipment, functionality and operational manual for the following specialised coating applications: • Passive Fire Protective Coating • Thermal Metal Spray Coating • Fusion Bonded Epoxy Coating • Bituminous Enamel Coating • Concrete Coating • Ceramic Coating • Elastomer Coating • External Polyethylene and Polypropylene Coating • Subsea Coating	3.1 Determine type of specialised protective coating equipment 3.2 Test equipment connections 3.3 Set equipment operation parameters 3.4 Check equipment condition and functionality 3.5 Test specialised protective coating equipment functionality and safety 3.6 Gather touch up coating tools 3.7 Check touch up coating tools condition and functionality	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	3.1 Specialised protective coating equipment and connections assembled at work site according to work safety requirements 3.2 Specialised protective coating equipment operational parameter settings demonstrated according to coating work requirements 3.3 Touch up coating tools listed and selected according to coating work requirements 3.4 Touch up coating tools condition and functionality explained according to coating work requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Lining Coating • Surface treatment and PTFE Coating 3.2 Touch up coating tools and functionality such as: • Roller • Paint brush • Others 3.3 Specialised protective coating equipment cleanliness criteria for: • Unclogged • No coating residue			
4. Carry out specialised protective coating equipment servicing	4.1 Equipment servicing method for each of the following specialised protective coating applications : • Passive Fire Protective Coating • Thermal Metal Spray Coating • Fusion Bonded Epoxy Coating • Bituminous Enamel Coating • Concrete Coating • Ceramic Coating • Elastomer Coating • External Polyethylene and Polypropylene	4.1 Determine coating equipment required servicing 4.2 Utilise coating equipment servicing tools 4.3 Test equipment functionality and conditions 4.4 Assess severity of equipment defects 4.5 Execute coating equipment cleaning 4.6 Determine worn out equipment to be repaired or replaced 4.7 Update coating equipment servicing record	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures	4.1 Specialised protective coating equipment to be serviced selected and demonstrated according to manufacturer's servicing guidelines 4.2 Worn out equipment listed for repair or replacement 4.3 Specialised protective coating equipment servicing and timesheet records filled in according to format

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	Coating • Subsea Coating • Lining Coating • Surface treatment and PTFE Coating 4.2 Sample of manufacturer's manual including : • Components and parts • Parameters • Servicing requirement 4.3 Common specialised protective coating equipment defects and worn out such as : • Cracked • Leak • Expand • Broken • Others 4.4 Specialised protective coating equipment servicing record 4.5 Specialised protective coating equipment timesheet record	4.8 Update coating equipment timesheet record	• Adhere to environmental requirements	
5. Perform specialised protective coating activity	5.1 Coating components: • Binder • Pigment	5.1 Check climatic conditions 5.2 Determine specialised protective coating	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard	5.1 Coating standards and codes listed and described according to coating work requirements 5.2 Coating procedure demonstrated

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Solvent • Thermal Metal Spray: Aluminium, Zinc and their Alloys and Composites 5.2 Coating system types such as : • Primer • Mid-coats • Finishing coats 5.3 Coating climatic condition requirements such as : • Ambient temperature • Dew point temperature • Relative humidity • Surface temperature • Wet temperature • Dry temperature 5.4 Coating standards requirements such as: • Wet Film Thickness (WFT) • Dry Film Thickness (DFT) • Technical standards: - Steel Structures Paint Council, SSPC (SP 5, 6, 7, 10) - National Association Corrosion Engineers, NACE	standards 5.3 Cover non-required coating surface 5.4 Check area to be coated 5.5 Mix specialised protective coating materials 5.6 Stripe coat the surface if necessary 5.7 Coat the required surface 5.8 Apply specialised protective coating techniques 5.9 Check surface profile 5.10 Utilise surface profile inspection tools 5.11 Execute work area housekeeping	operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	and achieved the standard coating specifications 5.3 Coated surface profile explained and presented according to standard coating specifications 5.4 Coating work area housekeeping procedure demonstrated according to housekeeping requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	- ASTM (D 4414, D 869, D 3359, D 4541, D 4752, D 610, D 4214, D 523, D 870, D 2485, D 3276, D 5064, D 5164, G 8) - ISO 8501:2007 - Swedish Std SIS 0559001967) - British Std BS4232 - National Fire Protection Association NFPA 35 5.5 Coating area and equipment protection such as: • Types of protection methods for : - Instrument - Gauges - Cables - Electrical components - Valves and pipes - Detector and sensor - Safety equipment and components • Types of protection materials such as : - Heavy duty canvas - Tarpaulin canvas - Plastic sheets - Heavy duty tape - Others			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	5.6 Coating mixing work requirements: • Mixing tank • Mixing tools and equipment • Mixing procedure 5.7 Surface profile visual inspection for: • Contamination • Blasting defects 5.8 Surface profile inspection tools : • Magnifying Glass • Adhesive Tape (ISO 8502-3) • Surface Comparator • Wet Thickness Gauge • Digital Profile Gauge • Dry Film Thickness Gauge (DFT Gauge) • Pull Off Adhesion Tester • Hydraulic Adhesion Tester • Magnetic Pull Off Gauge • Whirling Hygrometer • Wet Sponge Pin Hole Detector • DC Holiday Detector • Cross Cut • X Cut • Salt Contamination			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	Tester • Dew Point Calculator • Magnetic Steel Thermometer 5.9 Specialised protective coating techniques 5.10 Common coat application defects and causes such as: • Fast Dry • Dry spray • Over thickness • Hiding • Sagging • Wrinkling • Not dry • Orange peel • Brush mark • Bleeding • Failure-paint • Pinhole and pores 5.11 Common coat defects and causes such as: • Flaking • Delamination • Undercut • Blister • Pinhole • Bleeding • Alligator • Fish eye • Flaking • Impact damage			

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	5.12 Coating work area housekeeping requirements such as: • Tools • Equipment • Materials • Space • Procedure • Paint storage • Scheduled wastes			
6. Perform specialised protective coating finishing and small repairs	6.1 Causes for incomplete coated area such as: • Inaccessible area • Missed spray • Blocked area • Sensitive equipment area • Dangerous area • Sensitive surface • Equipment malfunction • Other 6.2 Method of coating defects repair such as: • Re-blast: - Full blast - Spot blast - Sweep blast • Power tooling: - Drill - Grinder - Needle scaler	6.1 Check incomplete coating area 6.2 Determine type of coating defects 6.3 Repair coating application defects 6.4 Coat incomplete surface manually 6.5 Check final coated surface profile 6.6 Execute work area housekeeping	<u>ATTITUDE</u> • Comply with legislative requirements • Follow work standard operating procedures • Apply safety precautions • Safety consciousness <u>SAFETY</u> • Safety cautious at the worksite • Adhere to health and safety requirements • Practise ergonomics <u>ENVIRONMENT</u> • Adhere housekeeping procedures • Adhere to environmental requirements	6.1 Causes of incomplete specialised protective coating application defects listed and described according to standard coating specifications 6.2 Manual coating procedure demonstrated and achieved the standard coating specifications 6.3 Final coated surface profile explained and presented according to standard specialised protective coating specifications 6.4 Coating work area housekeeping procedure demonstrated according to housekeeping requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILLS	ATTITUDE/ SAFETY/ ENVIRONMENT	ASSESSMENT CRITERIA
	• Hand tools: - Wire brush - Chipping hammer - Hard scrapper - Abrasive pad - Roller - Paint brush			

Employability Skills

Core Abilities

- Please refer NCS-Core Abilities latest edition.

Social Values & Social Skills

- Please refer Handbook on Social Skills and Social Values in Technical Education and Vocational Training.

References for Learning Material Development

1 Construction Industry Development Board (CIDB). Module Protective Coating Blasting (PCB2). AkademiBinaan Malaysia.
2 Petronas Technical Standards. Technical Specification: September 2012. Protective Coatings and Linings. PTS 30.48.00.31.
3 Construction Industry Development Board (CIDB). 2009. Module Protective Coating, Blasting and Painting Level II.Antap Semenanjung
4 Construction Industry Development Board (CIDB). 2005. Module Protective Coating, Blasting and Painting Level II.Antap Semenanjung
5 World Centre For Materials Joining Technology. October 2012. Painting Inspection Grade 5A Blast Cleaning Preparation Operative. TWI Ltd, Training and Examination Services.
6 Institute of Materials Malaysia. Coating Quality Control Technician. Materials Technology Education.
7 Institute of Materials Malaysia. Protective Coating Technician. Materials Technology Education.

16. Delivery Mode

The following are the **recommended** training delivery modes:-

KNOWLEDGE	SKILL
• Lecture • Group discussion • E-learning, self-paced • E-learning, facilitate • Case study or Problem based learning (PBL) • Self-paced learning, non-electronic • One-on-one tutorial • Shop talk • Seminar	• Demonstration • Simulation • Project • Scenario based training (SBT) • Role play • Coaching • Observation • Mentoring

17. Tools, Equipment and Materials (TEM)

BLASTING AND PAINTING OPERATION

LEVEL 2

CU No.	CU CODE	COMPETENCY UNIT TITLE
CU1	F433-004-2:2018-C01	Blasting Equipment Preparation
CU2	F433-004-2:2018-C02	Painting Equipment Preparation
CU3	F433-004-2:2018-C03	Abrasive Blasting Operation
CU4	F433-004-2:2018-C04	Protective Coating and Painting Operation
CU5	F433-004-2:2018-C05	Blasting Material and Equipment Storage Handling
CU6	F433-004-2:2018-C06	Painting Material and Equipment Storage Handling
E1	F433-004-2:2018-E01	Specialised Surface Cleaning Application
E2	F433-004-2:2018-E02	Specialised Protective Coating Application

*Items listed refer to TEM's **minimum requirement** for skills delivery only.

No	ITEM*	RATIO (TEM : Trainees)	CU1	CU2	CU3	CU4	CU5	CU6	E1	E2
A. Tools				**Tick (√) where relevant**						
1	Power tooling for blasting	5:25		√					√	
2	Power tooling for painting	5:25			√					
3	Touch up painting tools	1:1			√					√
4	Protection materials for equipment, devices, piping and gauges	10:25	√	√	√				√	√
5	Hand tools for blasting	5:25		√						
6	Surface profile inspection tools	2:25			√					√
B. Equipment				**Tick (√) where relevant**						
1	Personal Protective Equipment (PPE)	1:1	√	√	√				√	√
2	Air compressor	1:25	√	√	√				√	√
3	After cooler system	1:25	√	√	√				√	√

No	ITEM*	RATIO (TEM : Trainees)	CU1	CU2	CU3	CU4	CU5	CU6	E1	E2
4	Blasting pot	2:25	√	√					√	
5	Air manifold	2:25	√	√	√				√	√
6	Breathing air system	2:25	√	√	√				√	√
7	Blasting helmet	1:5	√	√					√	
8	Air hose	2:5	√	√	√				√	√
9	Blast hose	2:5	√	√					√	
10	Air feud hose	2:5	√	√	√				√	√
11	Vacuum Dust Collector	1:25	√	√	√				√	√
12	Ventilation equipment	4:25	√	√	√				√	√
13	Air blower	2:25	√	√	√				√	√
14	Air less spray pump	3:25	√		√				√	
15	Conventional spray pot	3:25	√		√				√	
16	Safety equipment	10:25		√	√				√	√
C. Materials				**Tick (√) where relevant**						
1	Sample of blasting materials	1:5	√	√					√	
2	Sample of painting materials	1:5	√		√					√
3	Sample of Material Safety Data Sheet (MSDS)	1:1	√	√	√				√	√
4	Sample of Technical Data Sheet (TDS)	1:1	√	√	√				√	√
5	Sample of manufacturer's manual	1:1	√	√	√				√	√
6	Sample of equipment servicing record	1:1		√	√				√	√
7	Sample of equipment timesheet record	1:1		√	√				√	√
8	Sample of Job Safety Analysis (JSA)	1:1		√	√				√	√
9	Sample of Permit To Work (PTW)	1:1		√	√				√	√
10	Sample of work pack (work order)	1:1	√	√	√				√	√
11	Sample of Material Take Out (MTO) list	1:1								
12	Sample of manpower schedule	1:1								
13	Sample of blasting and painting report formats	1:1								

18. Training Hour Summary

The following table shows the nominal training hours based on recommendations made by the Standard Development Committee (SDC). For purpose of Malaysian Skills Certification through accredited centre training, the program duration is subject to Malaysian Skills Certification System.

BLASTING AND PAINTING OPERATION
LEVEL 2

CU CODE	COMPETENCY UNIT TITLE	WORK ACTIVITIES	RELATED KNOWLEDGE (HOURS)	RELATED SKILLS (HOURS)	TRAINING DURATION (HOURS)	SKILLS CREDIT
F433-004-2:2018-C01	Blasting Equipment Preparation	1. Prepare blasting work area	4	16	60	6
		2. Set up blasting equipment	4	16		
		3. Perform blasting work area housekeeping	4	16		
F433-004-2:2018-C02	Painting Equipment Preparation	1. Prepare painting work area	4	16	60	6
		2. Set up painting equipment	4	16		
		3. Perform painting work area housekeeping	4	16		
F433-004-2:2018-C03	Abrasive Blasting Operation	1. Interpret Blasting Job Safety Analysis or Permit To Work	4	16	140	14
		2. Inspect blasting media	4	16		
		3. Set up blasting equipment	4	16		
		4. Carry out blasting equipment servicing	8	26		
		5. Perform blasting activity	8	26		
		6. Perform blasting finishing and small repairs	4	8		
F433-004-2:2018-C04	Protective Coating and Painting Operation	1. Interpret Painting Job Safety Analysis or Permit To Work	4	18	120	12
		2. Inspect painting materials	4	18		

CU CODE	COMPETENCY UNIT TITLE	WORK ACTIVITIES	RELATED KNOWLEDGE (HOURS)	RELATED SKILLS (HOURS)	TRAINING DURATION (HOURS)	SKILLS CREDIT
		3. Set up painting equipment	4	18		
		4. Carry out painting equipment servicing	4	8		
		5. Perform painting activity	4	18		
		6. Perform painting finishing and small repairs	4	16		
F433-004-2:2018-C05	Blasting Material and Equipment Storage Handling	1. Identify blasting material and equipment storage requirements at work place	4	6	90	9
		2. Execute blasting material transfer plan	4	16		
		3. Perform blasting material labelling	4	16		
		4. Execute blasting equipment transfer plan	4	16		
		5. Perform blasting equipment labelling	4	16		
F433-004-2:2018-C06	Painting Material and Equipment Storage Handling	1. Identify painting material and equipment storage requirements at work place	4	6	90	9
		2. Execute painting material transfer plan	4	16		
		3. Perform painting material labelling	4	16		
		4. Execute painting equipment transfer plan	4	16		
		5. Perform painting equipment labelling	4	16		
TOTAL HOURS (CORE COMPETENCY)			120	440	560	56
F433-004-2:2018-E01	Specialised Surface Cleaning Application	1. Interpret Surface Cleaning Job Safety Analysis or Permit To Work	4	6	110	11
		2. Set up specialised surface cleaning equipment and tools	4	14		

CU CODE	COMPETENCY UNIT TITLE	WORK ACTIVITIES	RELATED KNOWLEDGE (HOURS)	RELATED SKILLS (HOURS)	TRAINING DURATION (HOURS)	SKILLS CREDIT
		3. Carry out specialised surface cleaning equipment servicing	8	24		
		4. Perform specialised surface cleaning activity	8	24		
		5. Perform surface cleaning finishing and small repairs	4	14		
F433-004-2:2018-E02	Specialised Protective Coating Application	1. Interpret specialised protective coating Job Safety Analysis or Permit To Work	4	8	130	13
		2. Inspect specialised protective coating materials	4	14		
		3. Set up specialised protective coating equipment	8	24		
		4. Carry out specialised protective coating equipment servicing	8	24		
		5. Perform specialised protective coating activity	4	14		
		6. Perform specialised protective coating finishing and small repairs	4	14		
TOTAL HOURS (ELECTIVE COMPETENCY)			60	180	240	24